V-RAY MATERIAL SETTINGS

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VM

V I S M A S T E R S™

INTRODUCTION

The basic material settings tutorial explains almost all material parameters of the V-Ray material. If you are new to V-Ray, please read the basic render settings tutorial first, so you can start this tutorial in the correct way.

The V-Ray version I used for this tutorial is 1.47.03.

1. Set render settings

Open the render settings dialog and do the following:
- set V-Ray as the renderer
- output size to 480x360px
- global switches: turn off default lights
- image sampler to adaptive QMC
- antialiasing filter "Mitchell-Netravali"
- indirect illumination ON
- Secondary bounces multiplier to 0,85
- Irradiance map settings:
    - "low" preset
    - HSph subdivs = 30
- environment:
    - skylight pure white color
    - reflection/refraction pure white, 1,2 multiplier
- system: render region division 50x50px
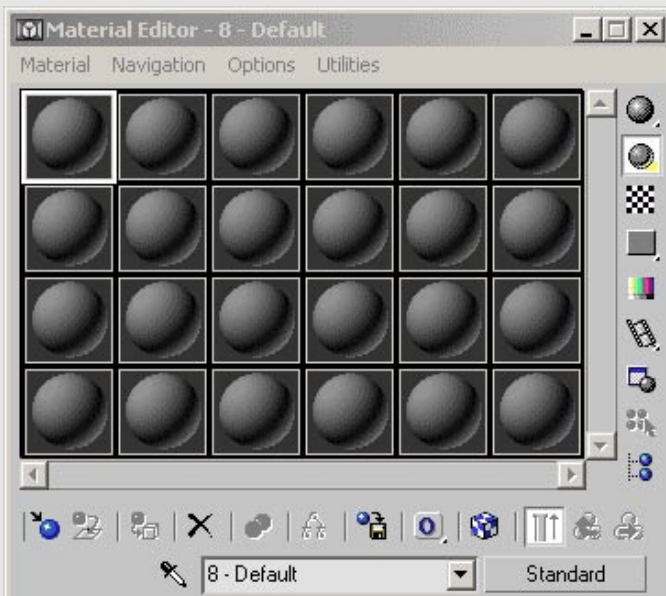
2. Create a test scene
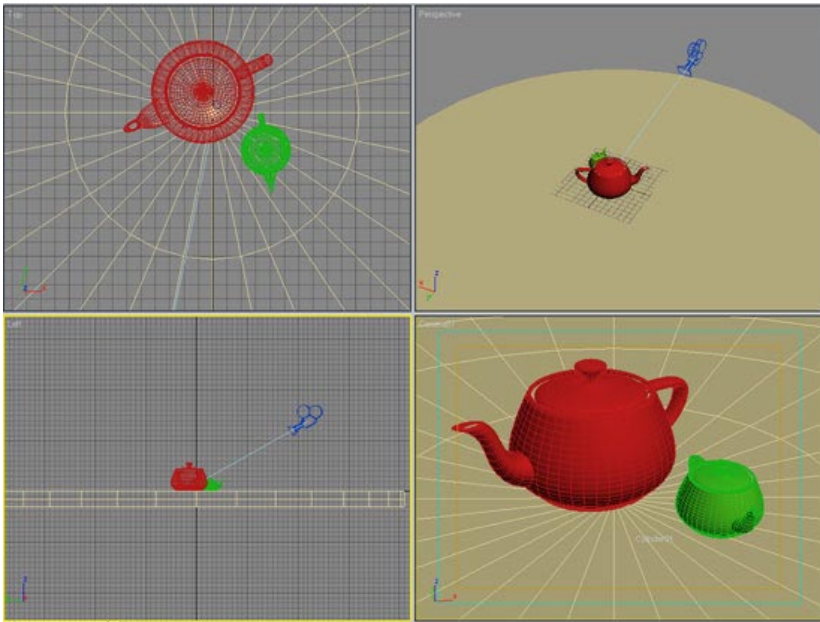
Keep it simple. A teapot is a good object for test renders, because of its shape. That's why it was one of the first 3D objects out there!

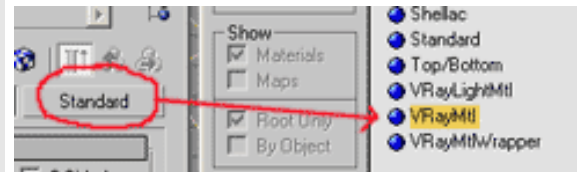Make two teapots on a larger plane if you want to follow this tutorial as close as possible..

3. Open the material editor

Open the material editor by pressing "m" on the keyboard.

4. Load a V-Ray material

Press the "standard" button in the material editor and select VRayMtl from the list. Double click or drag and drop it into one of the material slots.
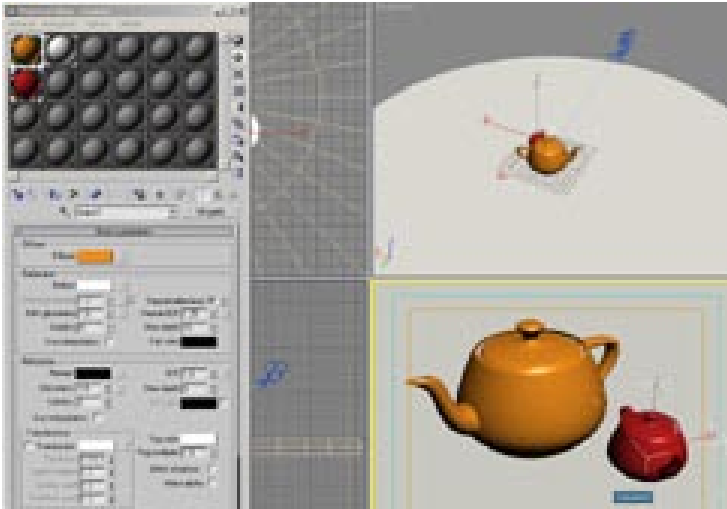

5. Rename and color

Rename the material "teapot1". The first parameter in the material is the diffuse slot. This is the main color of the material. The square next to it is a map slot, you can load bitmaps or other kind of maps here to texture the material. For now, simply make the color swatch a light orange color.
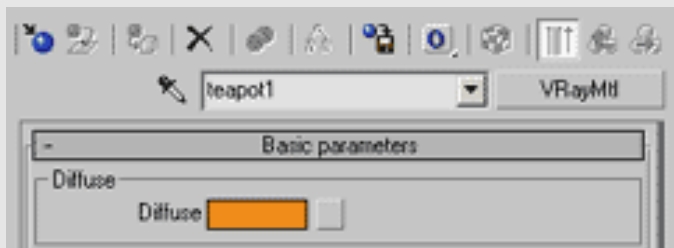
6. Second material

I Repeat the previous steps to make a very light grey material. Rename this material "ground plane" and assign it to the ground plane and small teapot. You should have something like in the image on the left.

7. First render

Hit render! Your image should look similar to mine, if you have set all render properties as in step 1. Make sure default lights are turned off.
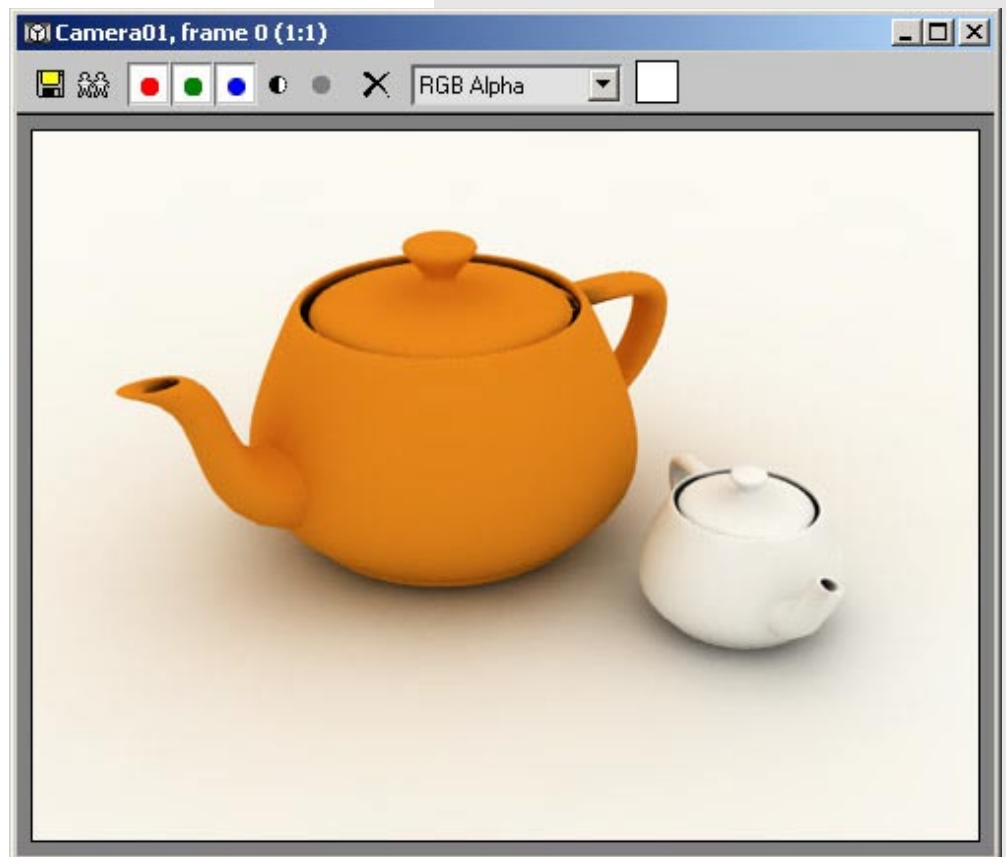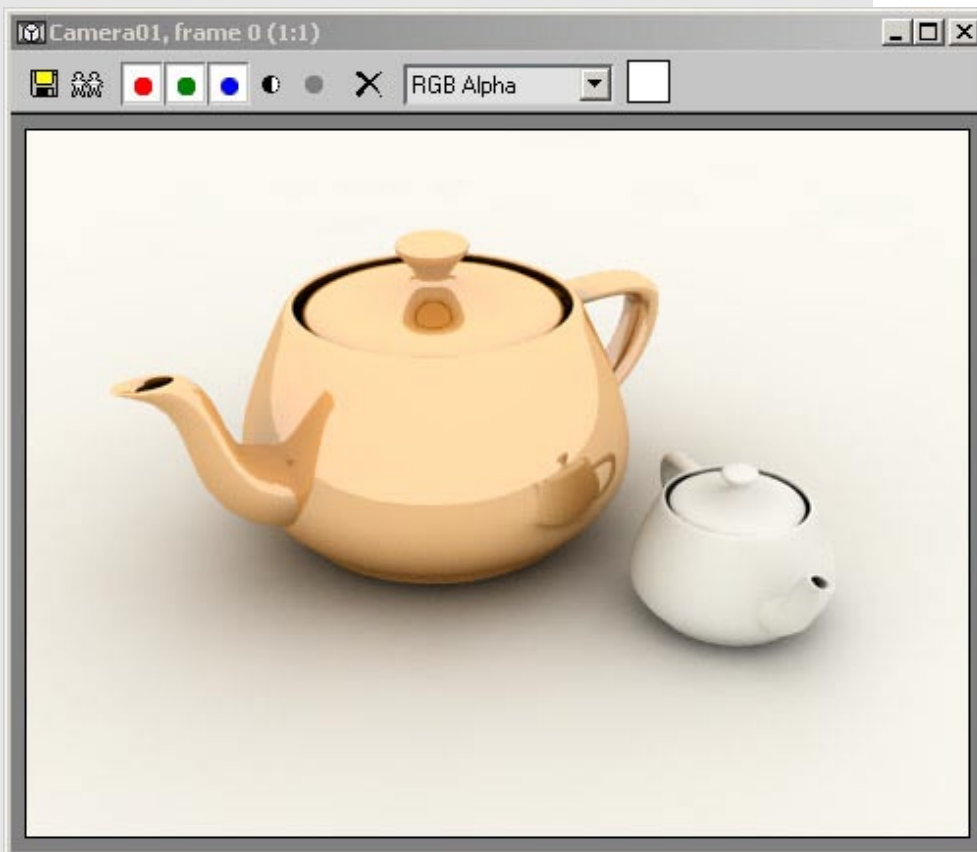
8. Reflections

Select the orange material in the material editor. Below the diffuse slot are the reflection options of the material. The color swatch next to 'reflect' is the main reflection control. Black means there is no reflection at all, white means the material will become 100% reflective. If you make it red for example, the reflections will be tinted red.

First try a medium grey color.

9. Render

Hit render. Notice the teapot becomes very reflective.

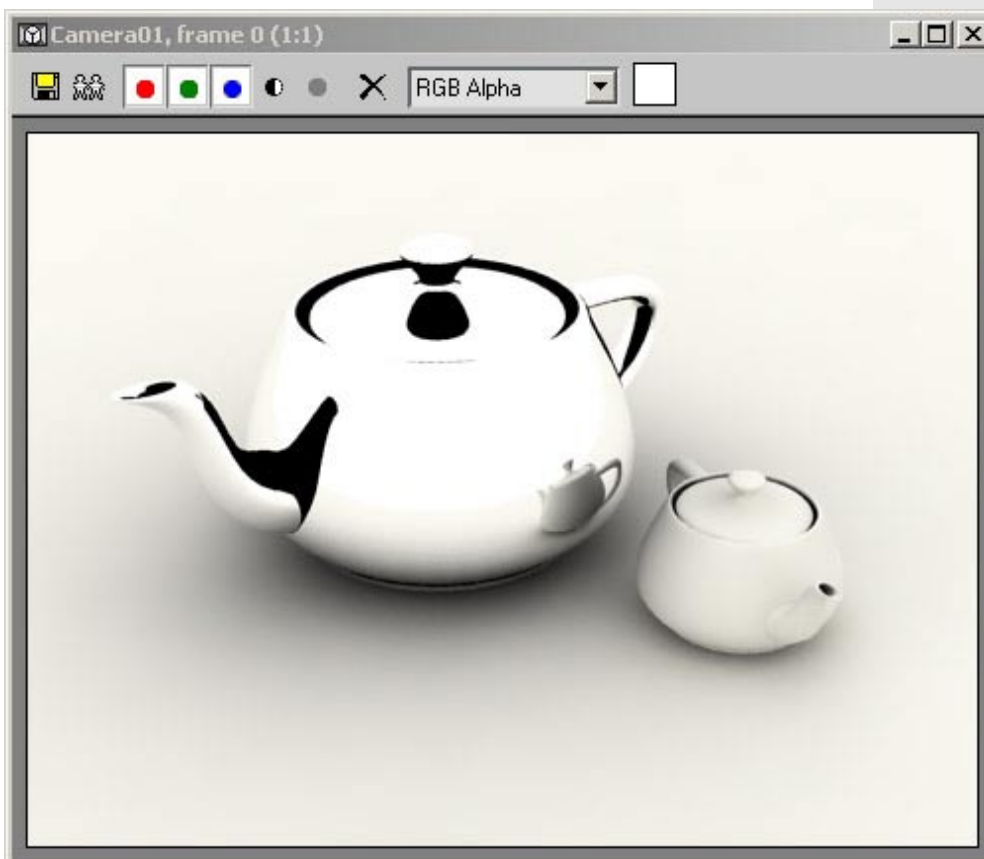Try a very dark grey, and very light grey too to see the difference.

10. Max depth

Set the reflection color to pure white, and set the max depth parameter to 1 and hit render.

You will notice that many areas turn black. The max depth controls how many times a ray can reflect before the calculation stops. Max depth of 1 means only 1 reflection can take place. 2 means a reflection of a reflection can exist and so on...
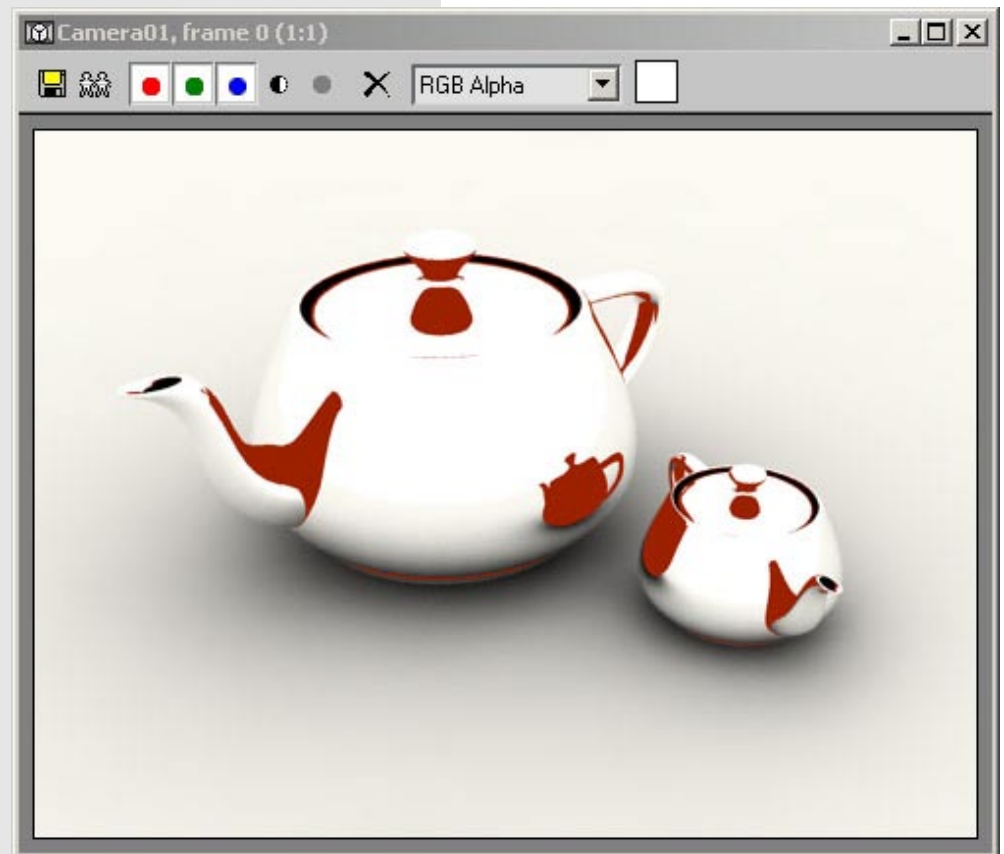
11. Exit color

Leave max depth at 1 and change the exit color to red. Assign this material also to the small teapot.

Render again.

Now all reflections of reflections turn red instead of black.

The max depth is a way to lower render times in scenes with lots of reflective objects. But by lowering the reflections, the exit color will likely come into play. Sometimes it is therefore useful to change this to another color than black, something more appropriate for the scene for example.

12. Max depth

Reset the exit color to black and play with the max depth parameter until most of the black areas disappear.

Usually you shouldn't go higher than 10. Higher numbers will only waist valuable render time for no visual improvement.
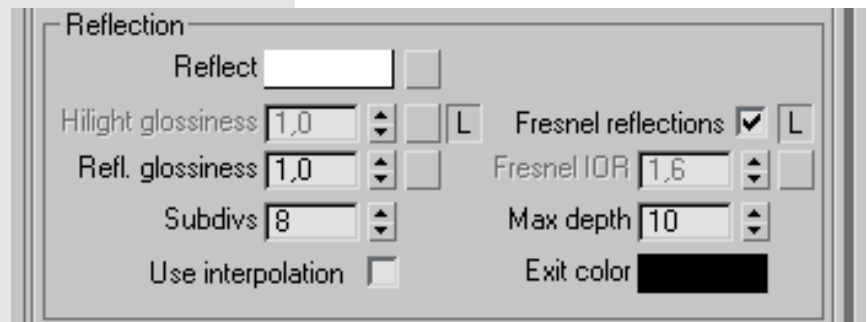
13. Fresnel reflections

Fresnel reflection is a phenomenon that happens on almost all reflective surfaces. Parts of the surface that point directly at you will reflect less than parts of the surface facing towards you under a greater angle.

The amount of the effect is controlled by the IOR of the material. You can find this in the refraction parameters. In real life, the fresnel effect is always linked to this IOR. In V-Ray however, you can unlink them, setting a different IOR for reflection as for refraction. To do this, click the small L next to the fresnel check box. The fresnel IOR box will become available.

14. Fresnel reflections

Leave the fresnel IOR at 1.6 and hit render. Notice the middle of the teapot has weaker reflections than the sides. This is the fresnel effect.

Lower the fresnel IOR to increase the effect. The lower you go, the less it will reflect in the middle. If you go really high, it will be the same as turning fresnel off (>25).
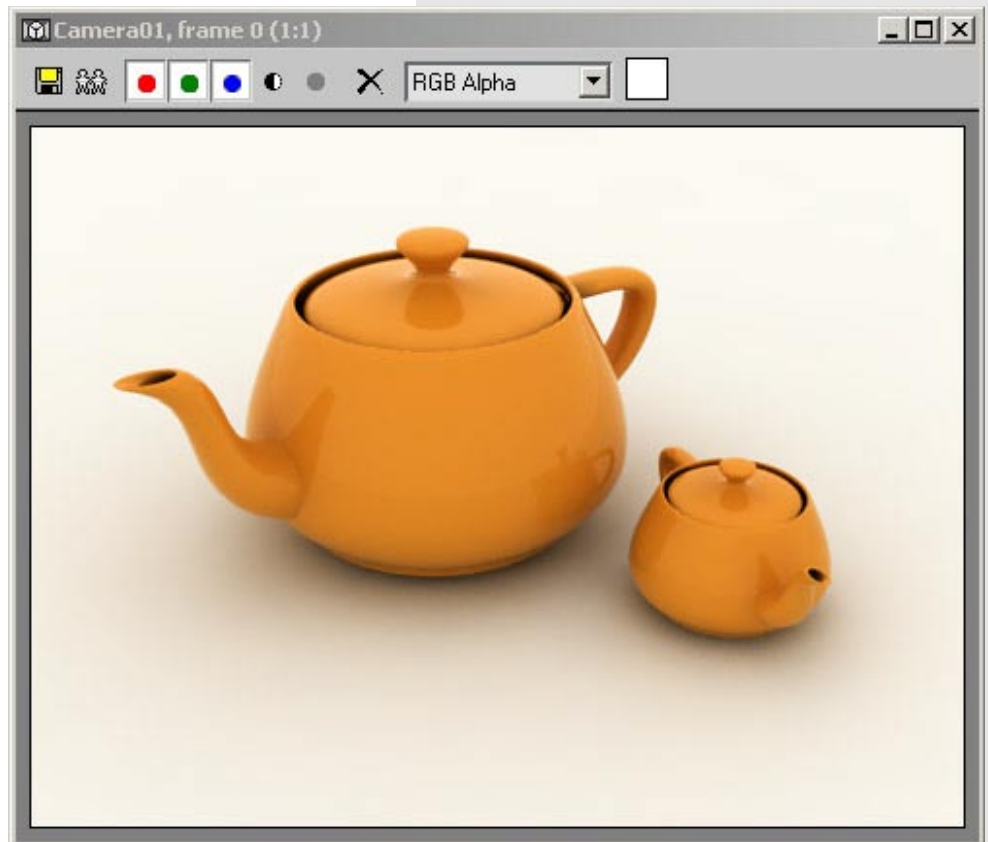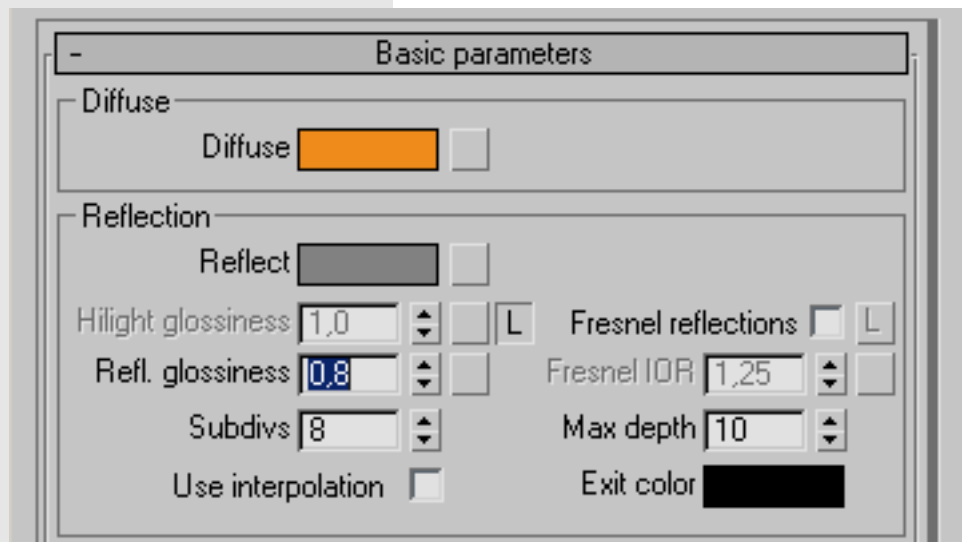
15. Teapot 2

Duplicate the orange material, rename it teapot 2 and assign it to the small teapot. Change the diffuse color to a dark red.

16. Reflection glossiness

Select the orange material. Change the reflection color back to a medium grey. Turn off fresnel reflections.

Change the reflection glossiness from 1.0 to 0.8.

17. Reflection glossiness

Hit render.
The reflections are very blurry now. This is the effect you get on real objects from very small bumps in the surface. To create this effect in 3D, you could also put a very fine bumpmap in the bumpmap slot. But by using the glossiness parameter instead, rendering will be a lot faster.

Play with the glossiness value to see what it does.

Glossiness means 'shininess', so glossiness=1.0 is 100% shiny, lower values are non glossy or blurry reflections. There is much confusion about this, many people will mix up the term glossy with blurry.

18. Smoother blurry reflections

The subdivs value beneath the refl glossiness controls the smoothness of the blurry reflections. Change it to 20 and render. The result is much smoother.

Note that 8 subdivs means 8x8=64 samples, 20 subdivs means 20x20=400 samples. Doubling the subdivs will take +-4 times longer to render!

Make sure you have the AA sampler at adaptive QMC when using high subdivs values! If you want to use adaptive subdivision AA, you can get away with much lower subdivs values (3 to 10). The adaptive AA smooths outs much of the noise from the low subdivs. If you have many blurry reflections in the scene, adaptive QMC will always be faster.

19. QMC settings: smooth the blurry reflections even more

If you want the noise to be even smoother, increasing the subdivs will not always help. Don't go higher than 40 trying to reduce the noise. A better solution can be found in the QMC sampler settings.

Open the render settings dialog and go to the QMC sampler rollout. Change the noise threshold to 0.001 and render again. The noise will be completely gone now, but at the cost of longer render times.

The QMC sampler settings give you an easy way to speed up test renders, by simply increasing the noise threshold to 0.05, for example. Note that the QMC sampler settings will also affect irradiance map calculation and DOF, MB, Area shadows, etc... So reducing noise will not only improve glossy effects, but also the GI quality etc...

For now, change the noise threshold back to 0.005. While we're here, go to the system rollout and enable the V-Ray stamp (delete all text except the render time part). You will see speed differences better that way.

20. Highlight glossiness

You probably know 'highlights' from the default max materials. Well, these highlights are nothing more than fake blurry reflections. A highlight is actually a reflection of a bright light source.

In previous versions of V-Ray, there was no way to render these fake highlights with V-Ray materials. At popular demand, the developers brought fake highlights to the V-Ray material.

Note that these highlights will only appear if you use lights in your scene. The skylight will not generate highlights.
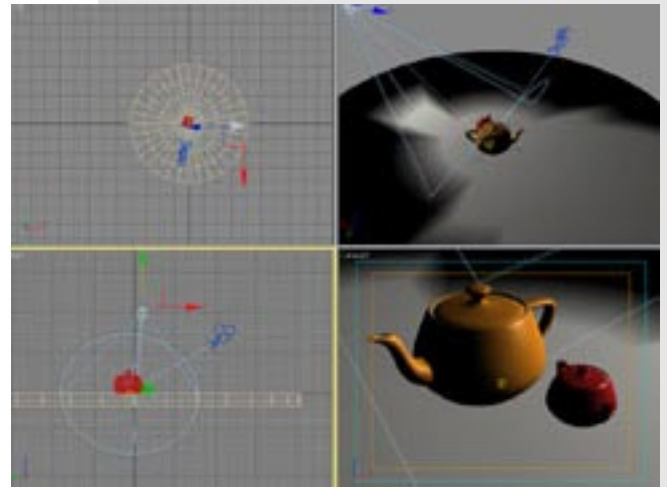
21. Create a spotlight

To see the effect of highlight glossiness, create a max spotlight directed at the two teapots.

Turn down the skylight multiplier to 0.0 for this test. We don't want any light to come from the sky.
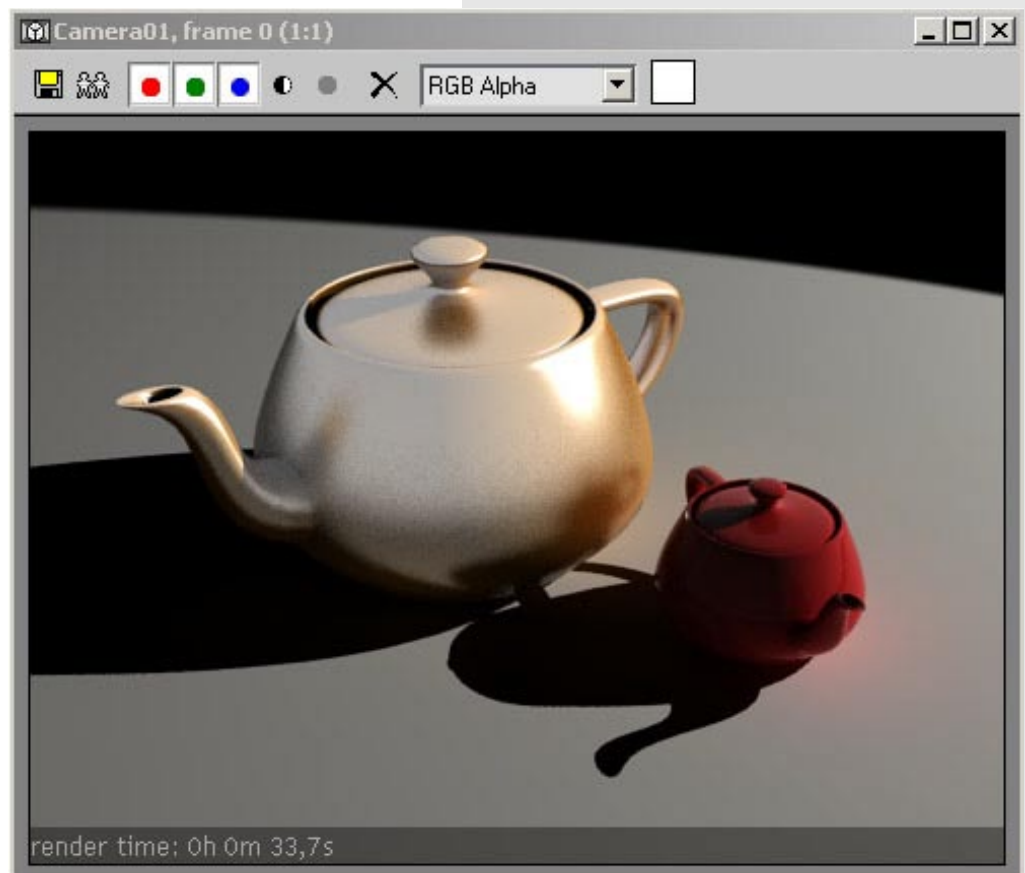
In the spotlight settings, turn on shadows and choose V-Ray shadows in the shadow type list.

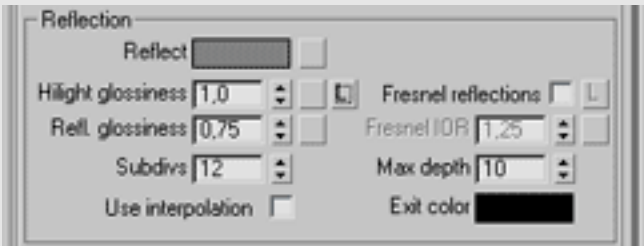# 22. Render

Render the scene.

The white part on the teapot is the highlight glossiness, the fake blurry reflection. A max spotlight is invisible to the camera and to reflections, but with this highlight glossiness parameter you can make it visible in reflections.
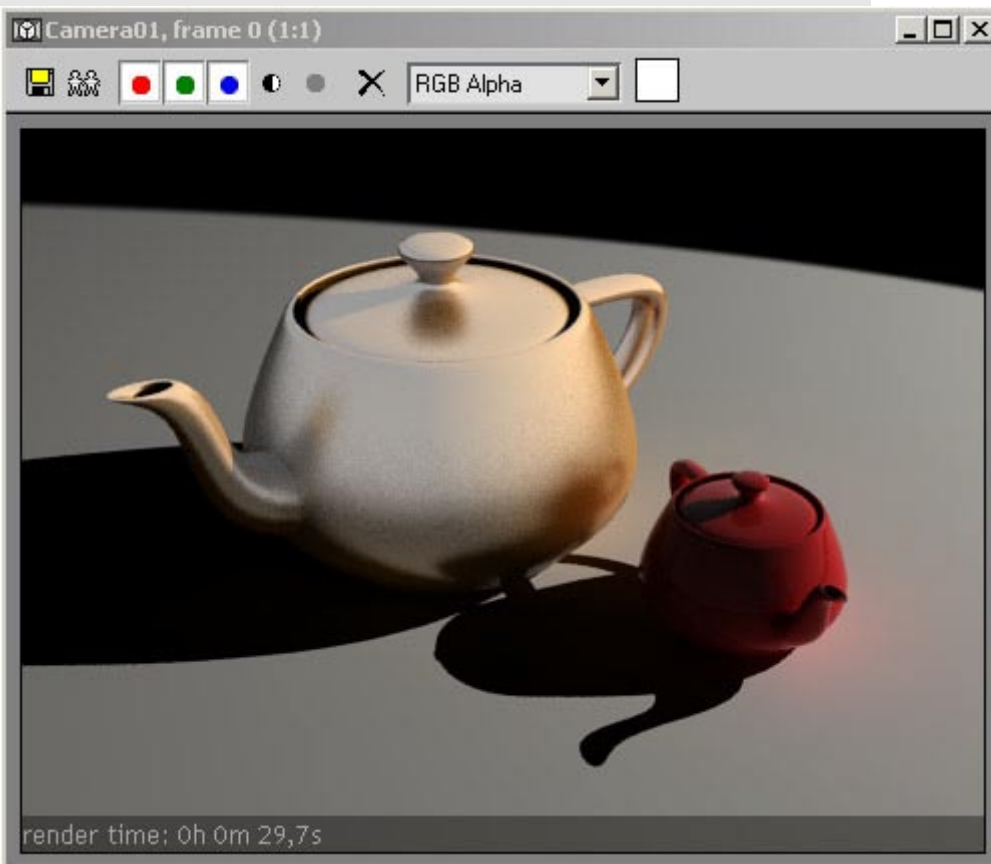
23. Highlight glossiness linked

By default, highlight glossiness setting is linked to the refl glossiness parameter. This means that when you use refl glossiness and you have lights in the scene, the highlight glossiness will appear too.

24. Unlink it!

Press the L button next to the highlight glossiness parameter. The highlight glossiness value becomes visible and is set to 1.0

Hit render.... the highlight is gone!

A value of 1.0 means no highlight glossiness (like 1.0 for blurry reflection means no blurry reflection).

25. Highlight glossiness only

If you want only the highlight glossiness to appear, and not the reflection glossiness, you will have to use a little trick.

Logically you would think that 1.0 for refl gloss will turn them off. This is true, but reflections will still appear, only sharp. Mixing sharp reflections with highlight glossiness creates weird unrealistic materials. Just try it. Set highlight gloss to 0.75 and refl gloss to 1.0 and hit render.

Although you may like this material, it is not realistic. It is reflecting the light source in a blurry way, and the rest of the environment in a sharp way! That's impossible in real life, as reflections don't make a difference between lights or whatever other objects.
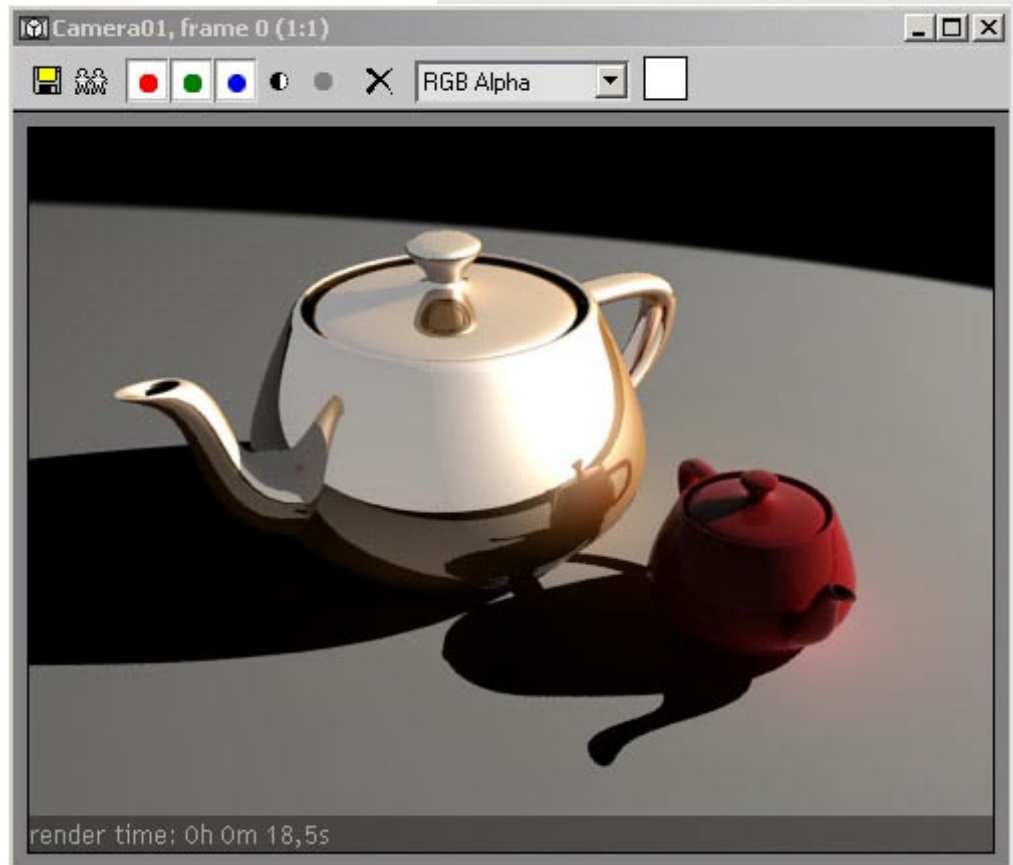

26. Turn off reflections

So to be able to render highlight gloss only, you need to turn off reflections for the material. This is possible in V-Ray, but the setting is hidden in the options rollout of the V-Ray material.
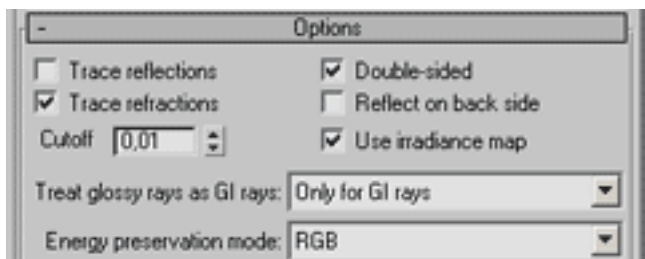
Deselect 'trace reflections' and render again.

Note that now the material has only the fake glossy reflections. This material looks like a standard max material with some highlights on it.
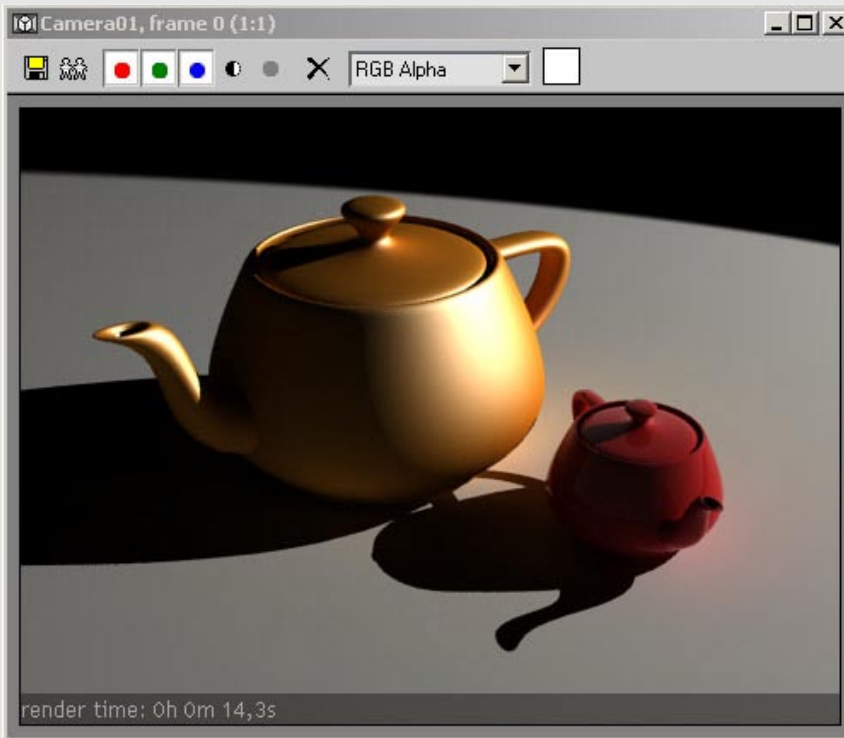
27. Map slots

Next to all reflection parameters is a map slot. This means you can control reflection color, refl glossiness, highlight glossiness and fresnel value by a map.

For example the reflection slot. Click it and choose "checker" from the list. Make it visible in the viewport so you can see if it maps the object correctly.

Set all other reflection settings back to default (medium grey, no fresnel, all glossy=1.0, trace reflections on). Delete the

spotlight and set skylight back to 1.0.

Hit render.

You will get something like in my example. All black parts of the map will be non reflective, all white parts are 100% reflective.

Try the same map in the other slots too. But take care, white for glossiness means a value of 1.0, so not blurry, and black means very blurry (value 0.0 for glossy).
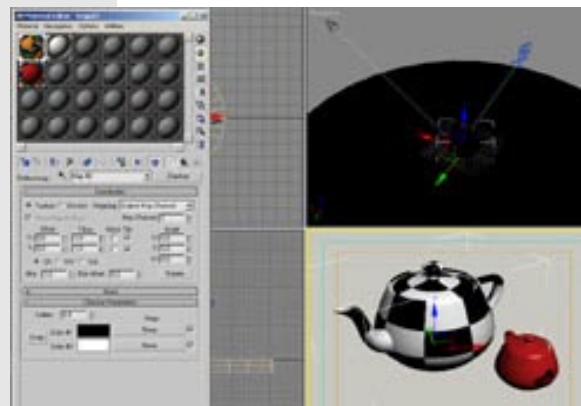
28. Use interpolation

There is one check box left in the reflection parameters that I didn't explain. The 'use interpolation' check box. This can be used to speed up the calculation of glossy reflections. It works more or less the same way as the Irradiance map for calculating GI.

When you check this box, you can adjust interpolation settings in one of the other V-Ray material rollouts.

I will not explain these settings, because I don't recommend using the interpolation for glossy reflections. They rarely look good, and when you want quality, they take almost as long as the standard glossy reflections.

The next section is about refraction

1. Start a new scene

Open 3D studio max and start a new scene.
Open the render settings dialog and do the following:
- set V-Ray as the renderer
- output size to 480x360px
- global switches: turn off default lights
- image sampler to adaptive QMC
- antialiasing filter "Mitchell-Netravali"
- indirect illumination ON
- Secondary bounces multiplier to 0,85
- Irradiance map settings:
    - "low" preset
    - HSph subdivs = 20
- environment:
    - skylight pure white color
    - reflection/refraction pure black, 1.0 multiplier
- system:
    - render region division 50*50 px
   - frame stamp: delete all except the render time part

2. Create the test scene

I suggest using the same kind of object as I did. A max teapot is not good now because the mesh has holes in it, it's not 'water-tight' and you don't want that on refractive objects. I made this modified torus knot because it will be an interesting shape to test with, because of all the curves and thin/thick areas.

If you want, use the exact same settings as I did.
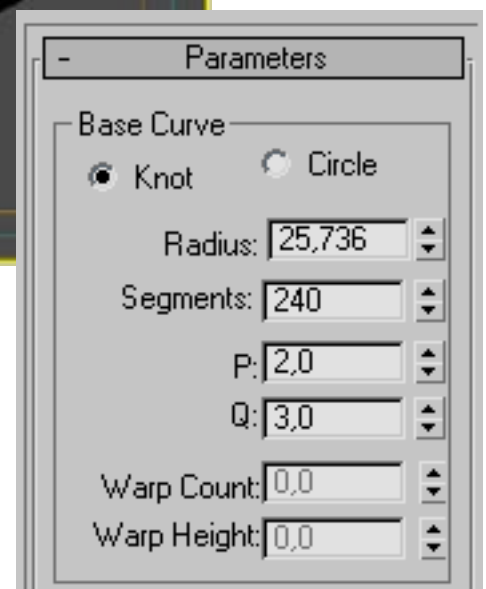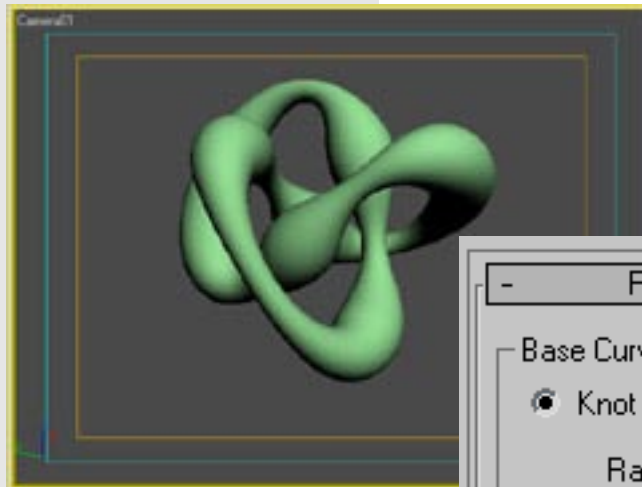
3. Create materials
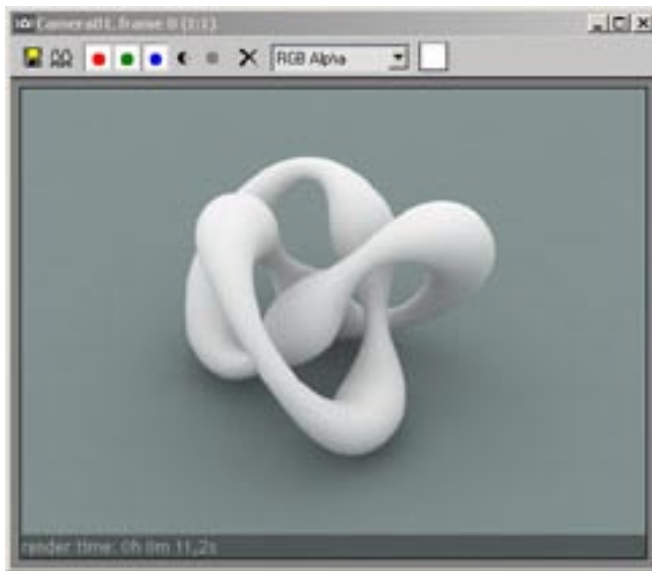
Make a medium dark blue V-Ray material for the ground plane, and a very light grey V-Ray material for the torus knot and assign them to the corresponding objects.

Hit render, you should get something like my example on the left.

4. Refraction parameters

Go to the white material and take a look at the refraction parameters. Refraction refers to light rays getting bent when going from one medium to another. For example light travels through air, then hits a glass object and the ray gets bent under a certain angle. Then this ray will travel further through the glass, and eventually will leave it at a certain point, getting bent again.

How much a ray gets bent depends on the IOR (index of refrac-

tion) of the material. A high IOR means a lot of bending, IOR=1.0 means the rays will not bend.
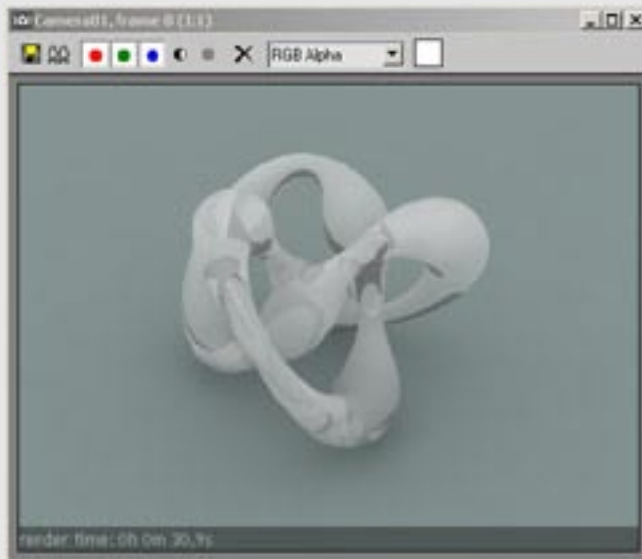
The V-Ray material has all options available to create any kind of refractive material. As you can see, many options are similar to the reflection parameters.

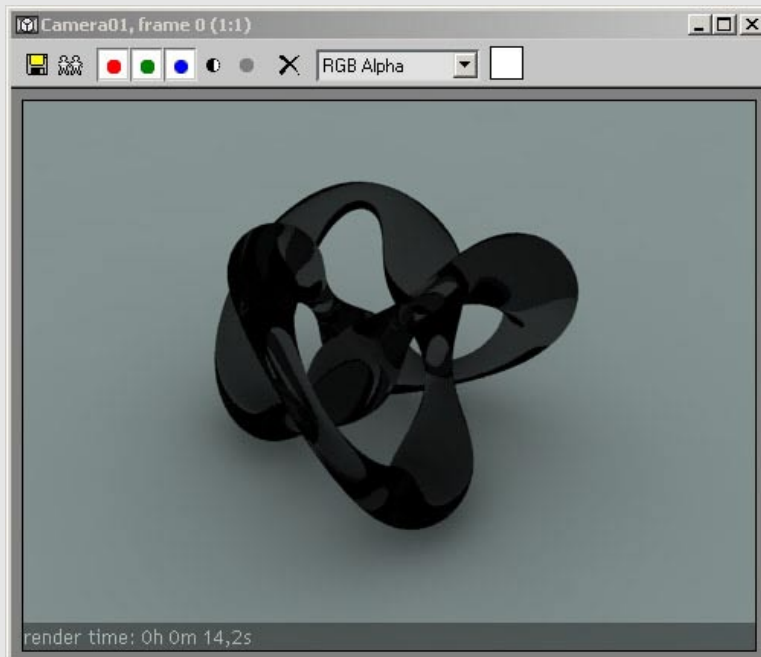First, change the refract color to a medium grey color.
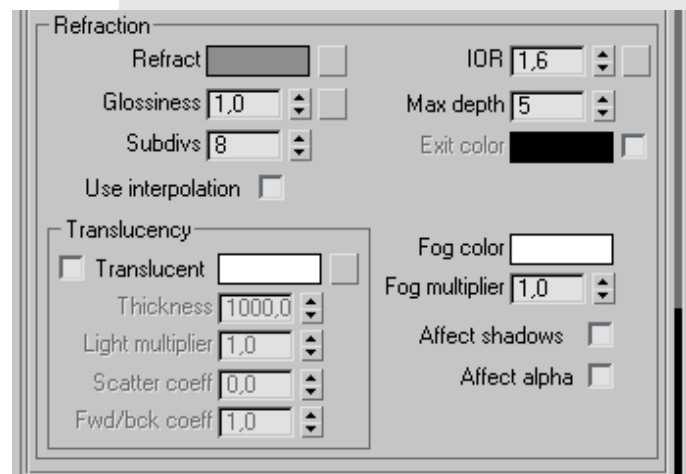
5. Refraction color

Render the image. You will notice the object has a transparent look. The grey refraction color means it's about 50% transparent.
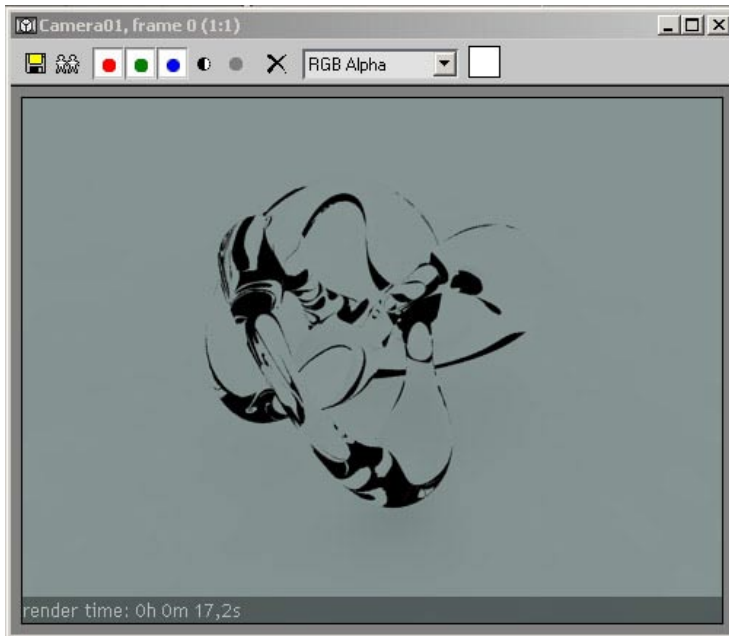

6. Diffuse color

Change the diffuse to black and render again. The result is pretty straightforward.

7. Refraction color

Change the refraction color to pure white and render. The result looks weird...

Because now the object is 100% transparent, the diffuse color has no effect at all anymore. The black regions are rays that get refracted to the environment color, which is black.

8. Adjust reflections

The previous step looks weird, because usually materials with such refractive properties are also reflective. If you set the reflection to pure white, and check fresnel reflections, the material looks a lot better. The material you created now is the basic setup for clear glass in V-Ray.
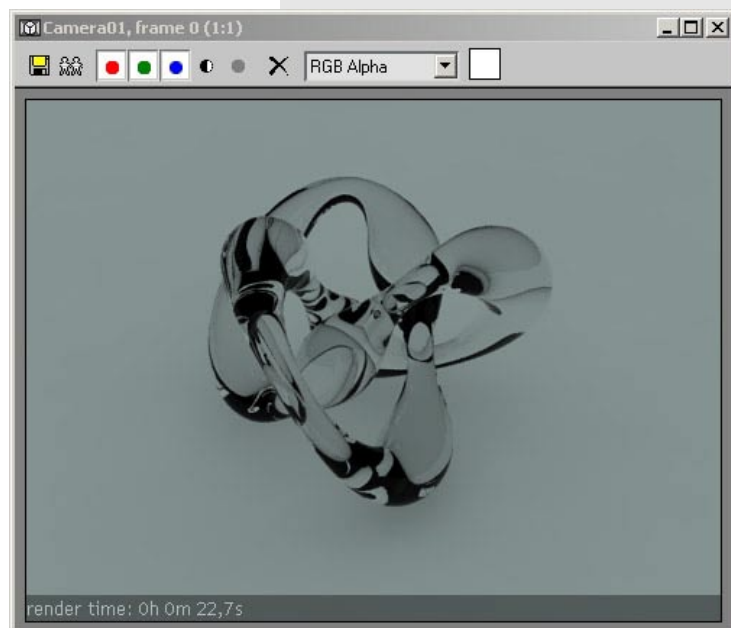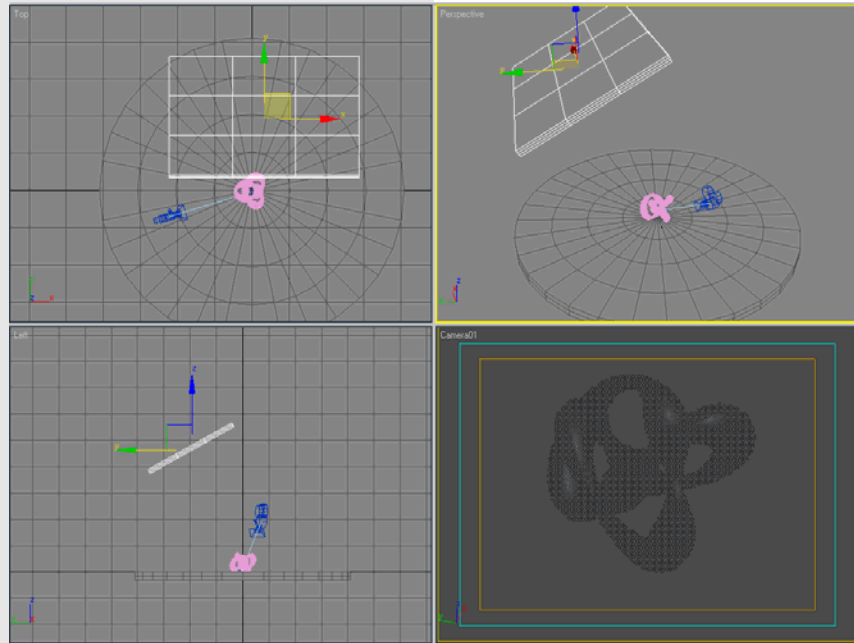
9. Create an environment

The rendering looks very boring, because the only thing to refract/reflect is the ground plane and the black environment color.

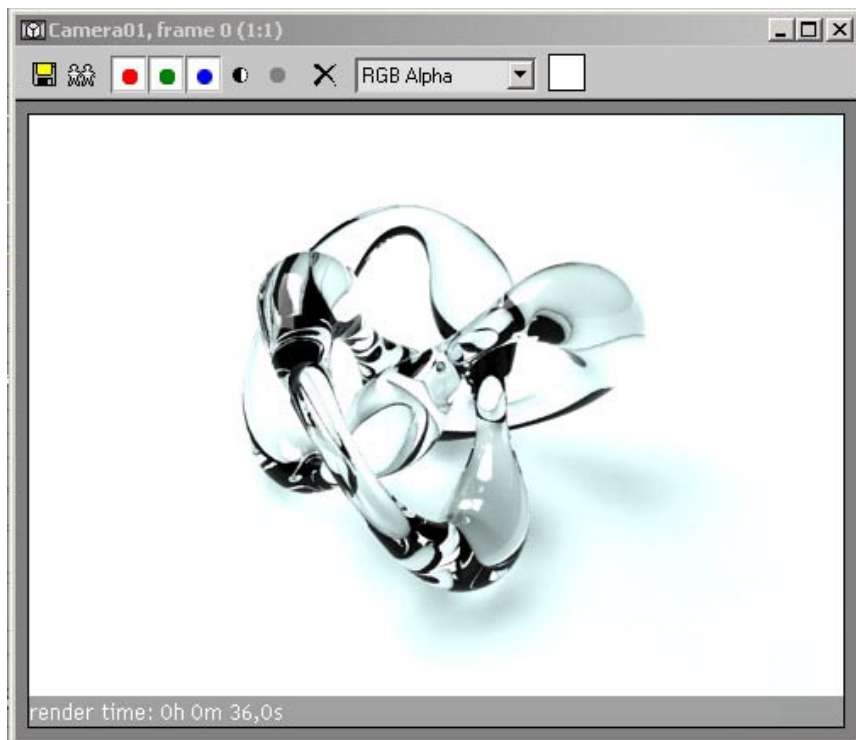Create a large, thin box and position it more or less like I did.

10. VrayLightMtl

The goal is to turn this box into a light source. An easy way to do this, is by using the special V-Ray light material. Click the get material button and choose VrayLightMtl from the list. Assign the material to the box and set the multiplier to 8.0
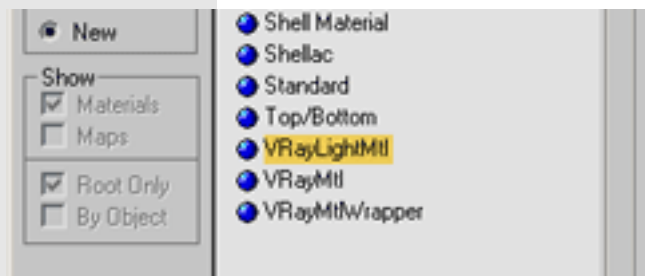
11. Adjust skylight

Hit render. It's way too bright, because our sky-light is still active. Set the skylight multiplier to 0.0 and render again. If it's too bright or too dark, you need to play with the V-Ray light material multi-plier until it looks okay.

You can clearly see the light is coming from our big box now, and the light source also reflects in the torus knot. The contrast between very bright light and black environment is very good for rendering glass or metal like objects.
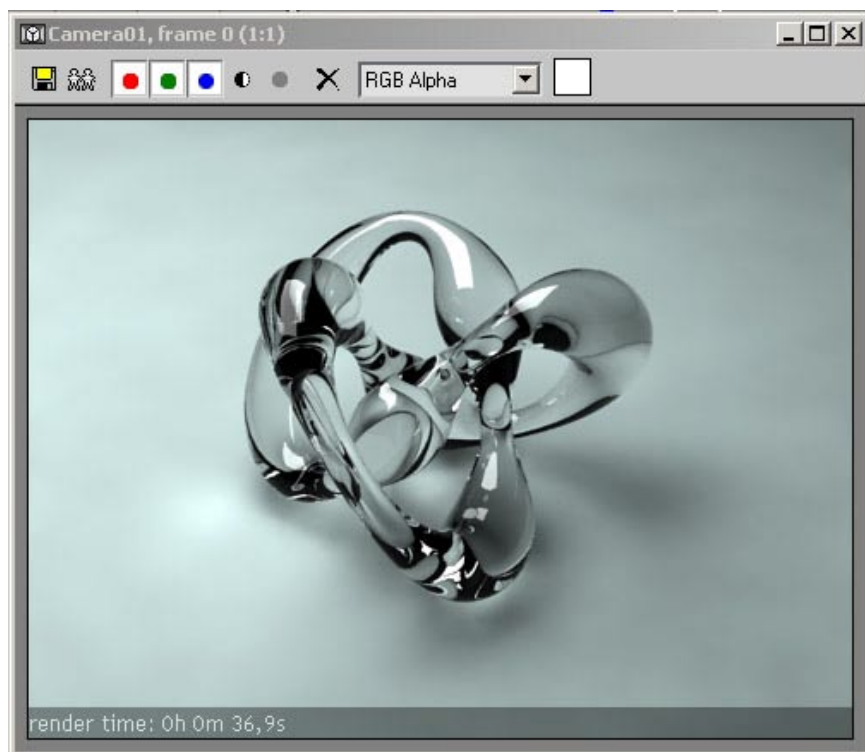
12. Refractive GI caustics

The light coming from the box is not direct light as with a max spotlight. It is actually treated as first bounce GI (just like the V-Ray skylight). If you would turn off GI and render, there will be no light at all.

Because of this, it is important that you leave the refractive GI caustics in the indirect illumination rollout ON. Try rendering this scene without refractive GI caustics.

You'll see the shadows are much darker. The GI light is now unable to pass trough the transparent object (there are no GI caustics). Caustics are noting more than refracted/reflected light.

To continue, turn refractive GI caustics On again. Also go to the irradiance map rollout and set the preset to custom. Change the min/max rate to -4/-2 to speed up rendering. Note that the GI will be more blurred now, but since we're only testing, it doesn't matter.

There will be more on caustics later on in the tutorial. For now remember that you need to enable the GI caustics if you want GI to pass trough transparent objects.
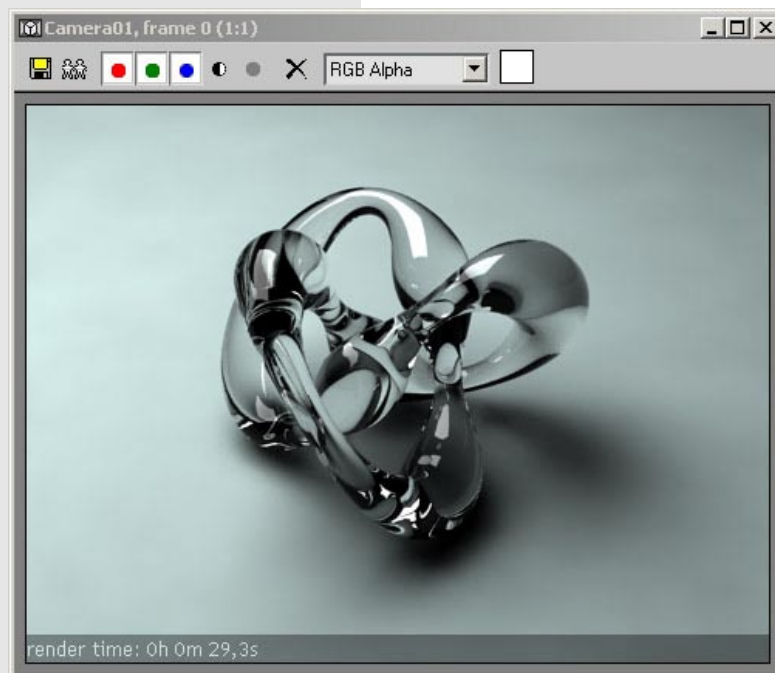
13. Max depth

Increase the max depth parameter in the glass material to 10, both for reflections and refractions. You'll notice a bit more variation in reflection/refraction. In some cases increasing the max depth really helps to make your glass more realistic. It doesn't matter much here because our environment is also black, just like the exit color when max depth is reached. In colored environments the max depth effect will be more noticeable.

To continue, reset the max depth to 5
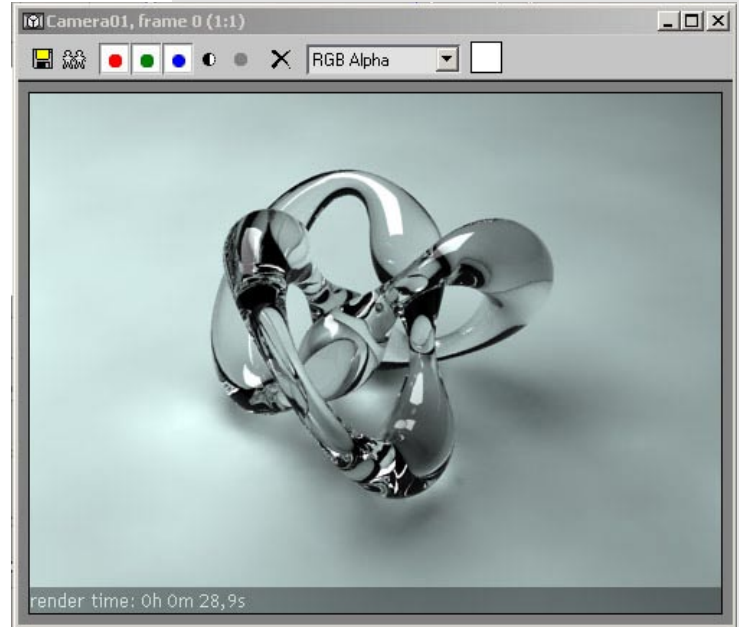
14. Options: reflect on backside

Go to the options rollout of the glass material, and turn on the 'reflect on backside' option. This will allow the inside of the surface to also reflect the environment. When rendering glass, you should leave this option turned on, it generates very nice and realistic inner reflections. This also increases render time of course...

To continue the tutorial, turn it OFF again.
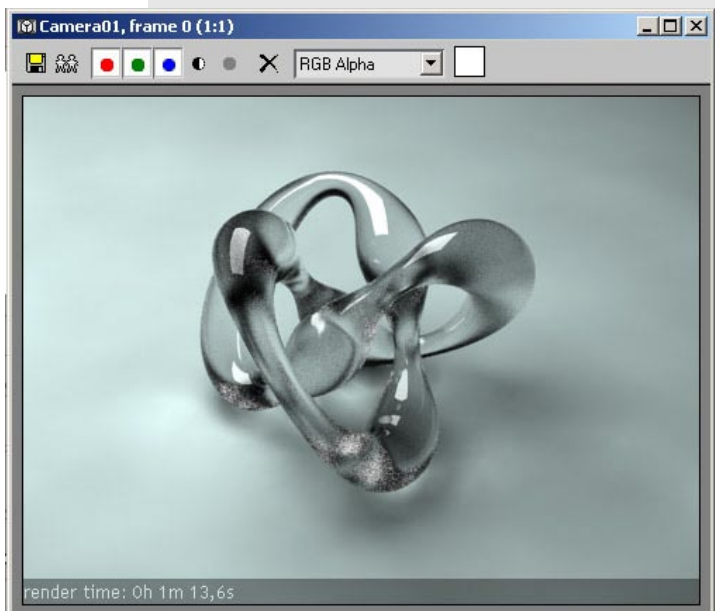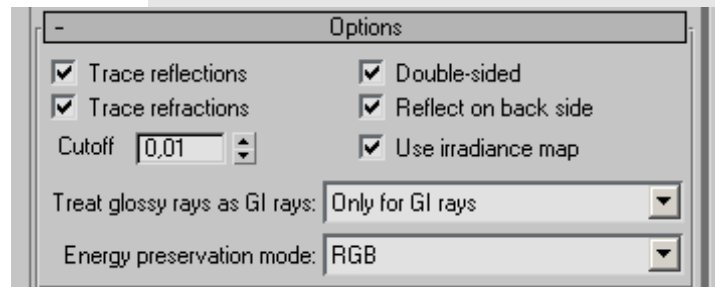
15. Glossiness

The glossiness parameter is similar to the one for reflections. It's use is to blur the refractions. This is one of the most time consuming settings, render times will go really high if you use high subdivs...

Try a value of 0.8 with 8 subdivs. You'll see that the blurry refractions are very noisy due to the low subdivs. But you get the idea.

Turn the glossiness back to 1.0
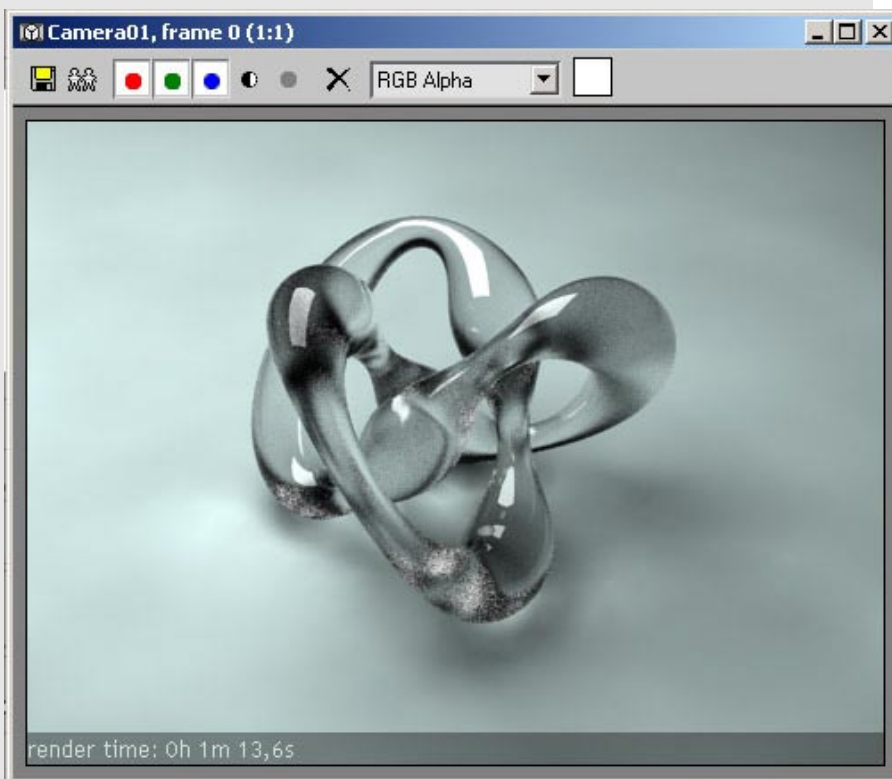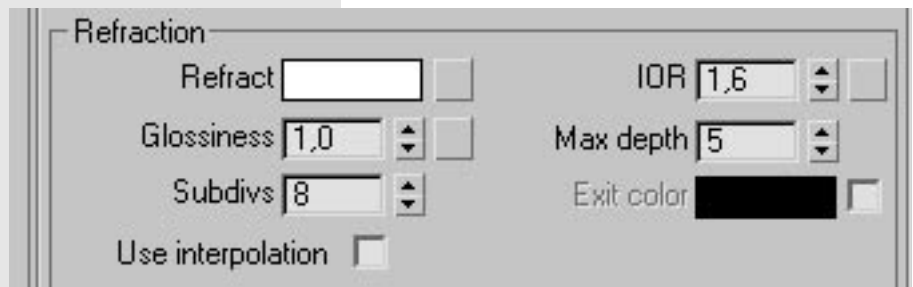
16. Index Of Refraction

Set the IOR to 1.0 and render. The torus is gone! This is because no rays get bent with this IOR value. Because fresnel IOR is linked to the refraction IOR, this is also set to 1.0, which means the object becomes non reflective too. The refraction color is pure white, so the rays don't become tinted either! All this makes the torus disappear.
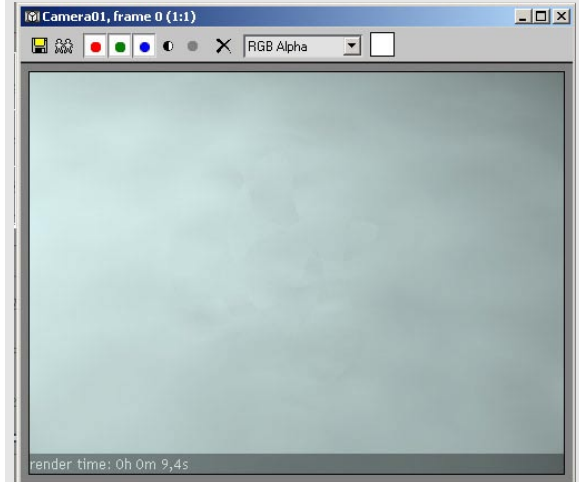
17. IOR

Unlink the fresnel IOR, so that its value is set to 1.6 again. Hit render.
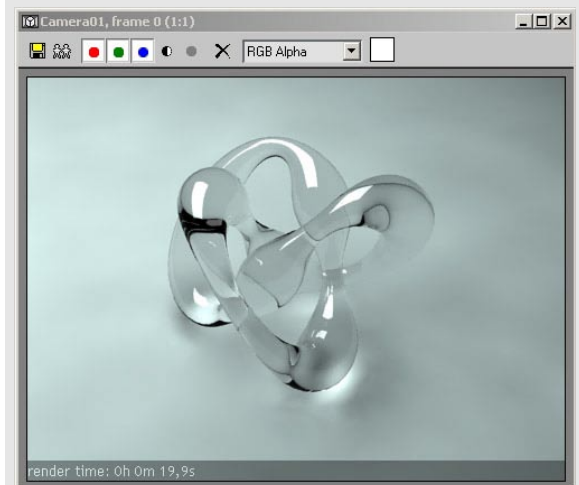
The thing you see now is purely created by reflections.
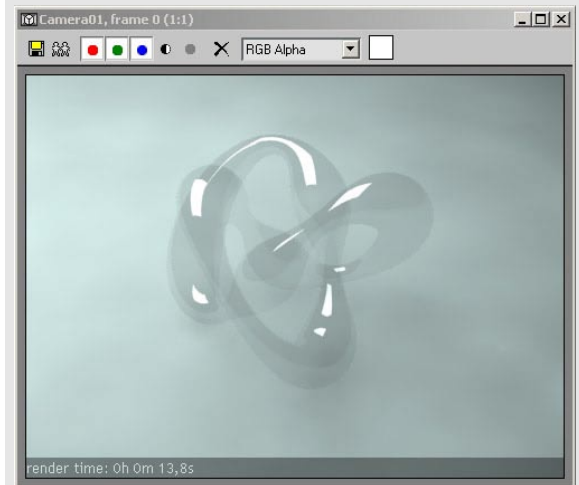
18. IOR

Set the refraction IOR to 1.1 and render again.

Each material has its own IOR value. Typical glass values are around 1.6. Do a google search for other common used material IOR's.
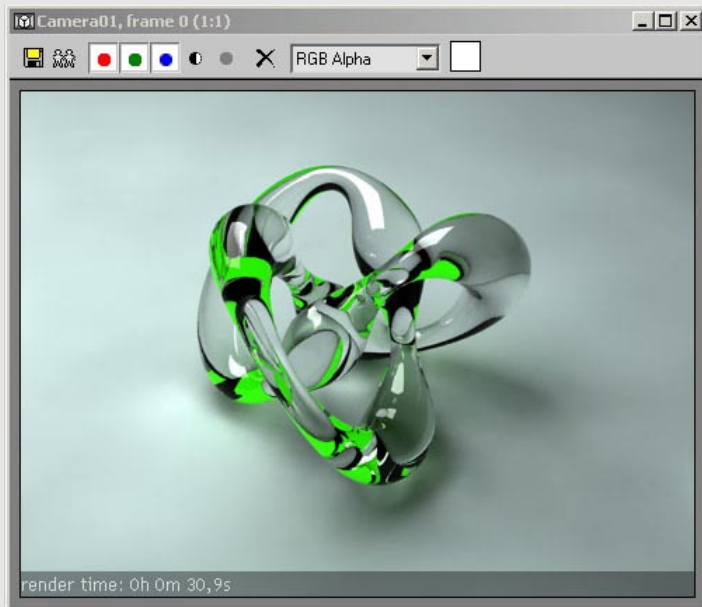
Render a few tests with different IOR values.

Reset the IOR to 1.6 to continue.

19. Exit color

Like with reflection, there's also an exit color for refractions. After a ray has refracted the max depth number of times, this exit color will come in to play. Tick the check box and give it a flashy green color. Hit render. You can clearly see what parts of the image go over the max depth number (5).

Make the exit color black again.

20. Fog color

The fog color is used to tint the refractions with a certain color. Thicker areas will become darker (more colored) than thinner areas. Try a light red color for fog and render.

The material is very dark, but the thinner parts show some transparency.

The fog color and fog multiplier are actually an absorption control. The light looses its energy while traveling through the material. The longer it travels, the more energy will be absorbed by the object. That's why thinner parts will remain lighter than the thicker parts.
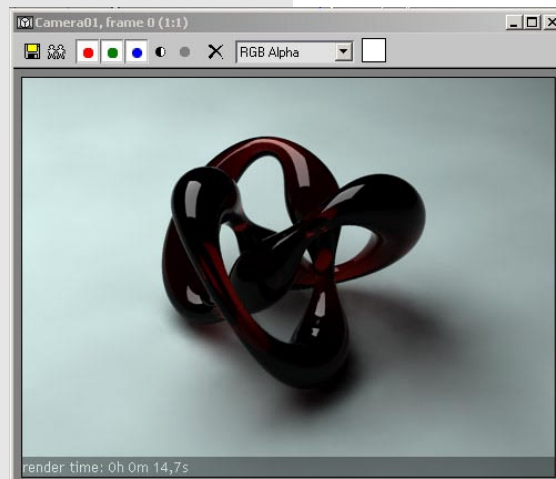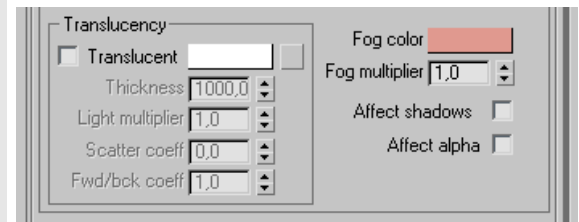
21. Fog multiplier

Change the fog multiplier to 0.05 and render again. The fog effect is much weaker now, letting more light pass through, resulting in a lighter material.
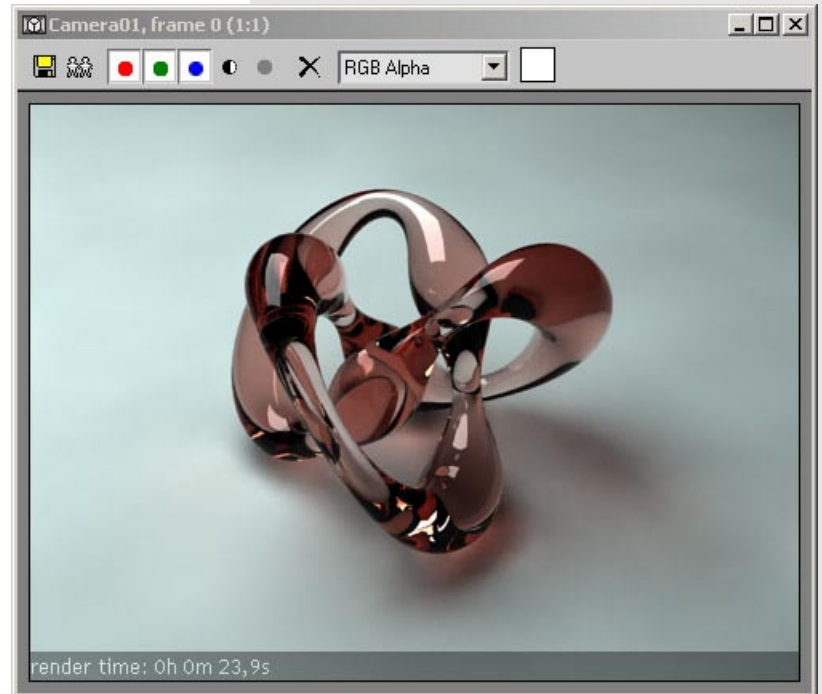
You should experiment with different fog color/multiplier ratios. For example a light but very saturated color with high multiplier, or a dark unsaturated color with a very low multiplier. You can get very different effects by playing with this relationship.

22. Refraction color

You probably think, what's the use of the refraction color then?

Well, set fog options back to default, and choose a red refract color. Hit render.

The glass is colored too, but without the absorption effect. Thin and thick areas are equally colored (the dark areas are refractions of the black environment!).

I usually use pure white for refract color and play only with the fog options. But experiment with different refract color/ fog settings to see what they do. Remember, dark refract color means less transparency. The saturation of the color has a huge impact on the look of the refraction. A very dark saturated color will look very similar to a very dark unsaturated color in the color swatch, but it will be completely different when used for refract color or fog color. Just try it!
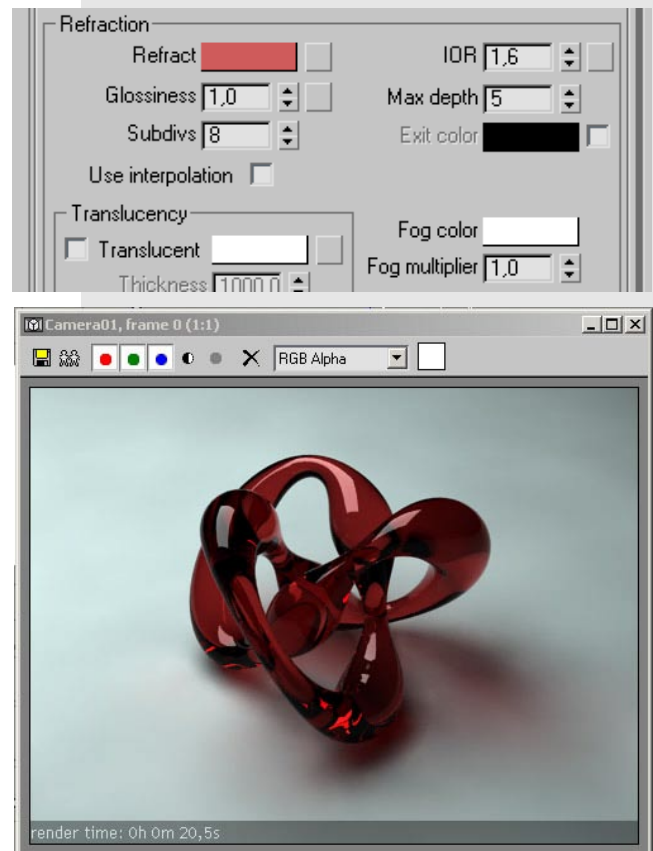
23. IOR=1.0 mixed with fog
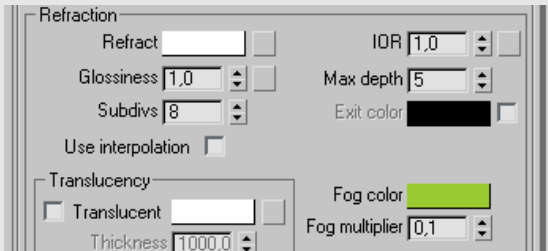
Adjust refraction settings to the ones on the right. By mixing an IOR of 1.0 with fog color, you get a waxy kind of material.

24. Glossiness + IOR=1.0 + fog

Adjust the glossiness to 0.75 and the subdivs to 16 and render again. The material looks a bit like reflective wax.
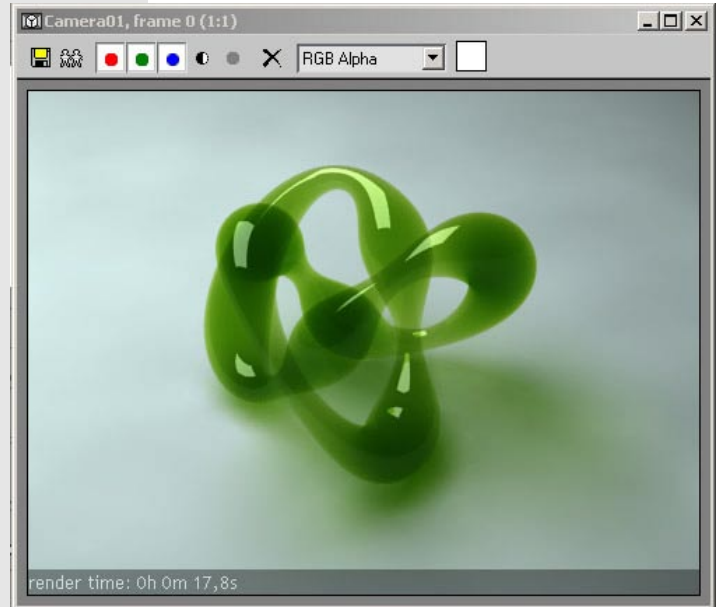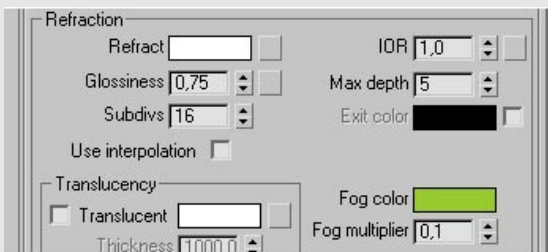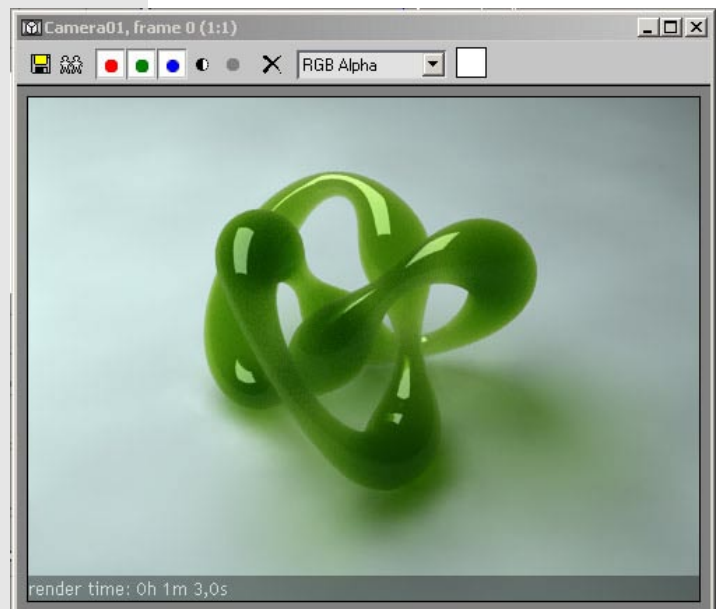
Turn glossiness to 1.0 again and IOR to 1.6 before continuing.

25. Affect shadows

An important option we didn't touch yet, it the affect shadows check box. It will have no effect in our test scene because there is no direct light, only GI light. The affect shadows options is only used with direct light rays.

Therefore, we will replace the light box with a V-Ray area light. Go to the create panel and choose lights, and from the drop down menu choose V-Ray.
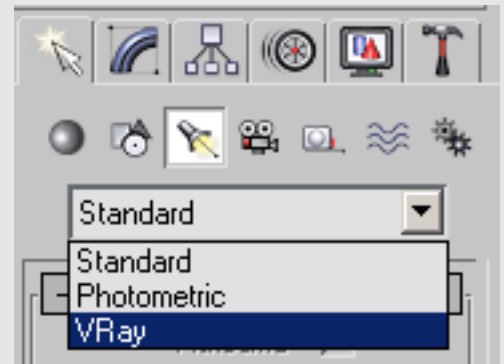
25. V-Ray Light

Click and drag in a viewport to create the V-Ray rectangular light. Make the size the same as our box, and position it in the same way. After that, hide the box. Set the V-Ray light settings as in the image on the right (click to enlarge). The multiplier should be equal to the multiplier of the V-Ray light material you used on the light box.

We now created a light source exactly the same as the light box, but it will cast raytraced area shadows.
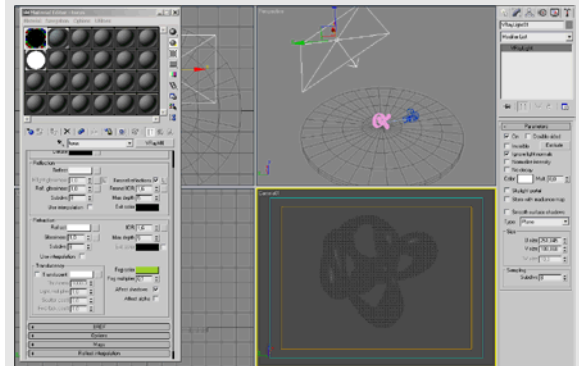
26. Affect shadows

In the glass material, turn ON affect shadows and hit render.

The image should look like mine. As you can see, it casts green shadows. This is because the affect shadows option and fog color is used.

Render time increases because the shadows are raytraced.

27. Affect shadows OFF

Turn affect shadows OFF and render again. Notice the shadows are different now. This is because the GI caustics come back into play. This image is the physically correct one! When you have the affect shadow option t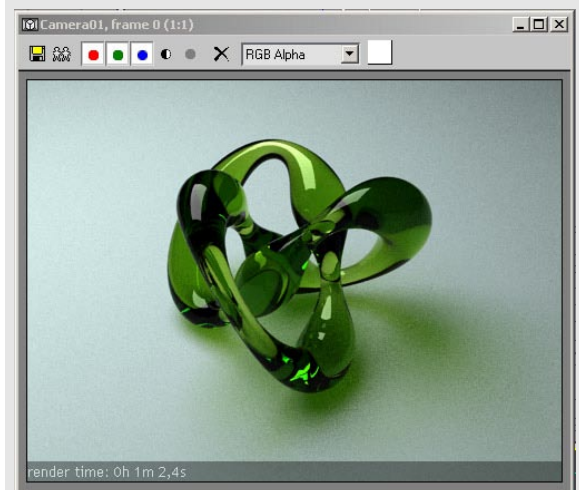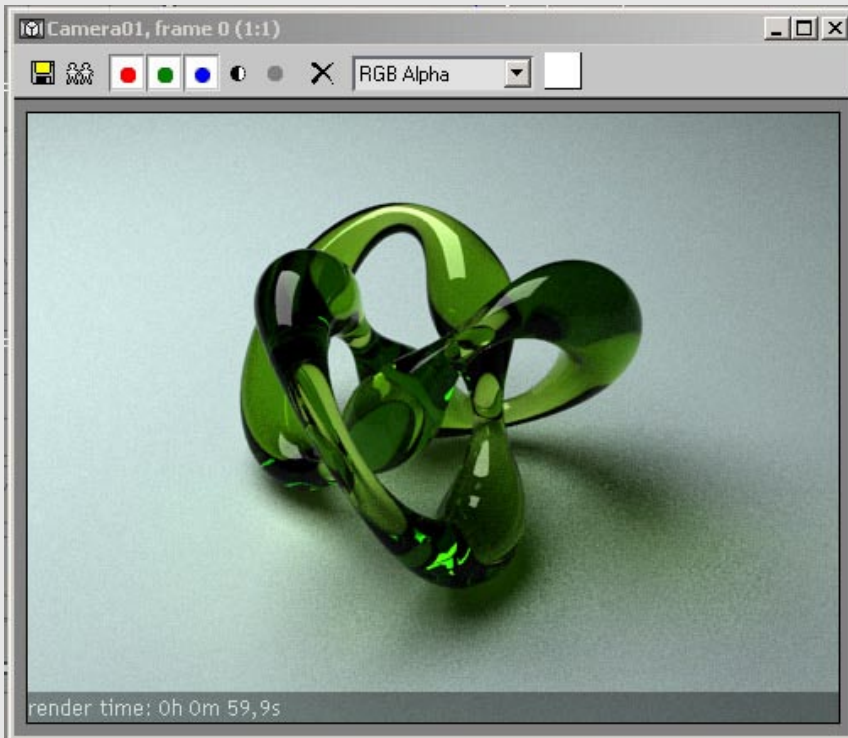urned ON, no refractive GI caustics are computed for that material, they are automatically turned off by V-Ray. The affect shadow option is nothing more than a 'fake caustics' option. So imagine that when using the affect shadow option, refractive caustics would not be turned off automatically, you would get a fake caustic effect AND a real GI caustic effect on top of each other! That's why V-Ray automatically turns off GI caustics for materials that have the affect shadow option turned on. THIS IS VERY IMPORTANT TO UNDERSTAND!

Use the affect shadows option when you want light to pass trough refractive objects, and you don't want to enable refractive GI caustics, or when you don't use GI at all, or when you're using Max lights. Max lights will never produce refractive GI caustics! So if you want the light of max lights to pass trough refractive objects, you MUST use the affect shadow option.

The top image on the right is rendered with an omni light as the only light source, and the affect shadows option is turned off. Notice the black shadows, no light passes through the material.

The bottom image has affect shadows turned on. There is a fake caustic effect but it's nowhere near physically correct.

Note that the V-Ray light is a special light. Although it casts direct light just like max lights do, they do produce GI caustics (max lights don't!). Normally only first bounce GI light (like the light coming from skylight and object lights like our light box) produces GI caustics.

If you want real caustics when using max lights, you need to enable caustics in the caustics rollout (photon mapped caustics). Don't do this right now, these caustics controls need a tutorial of their own... Just remember that you can get nice caustics effects by using GI and V-Ray lights much easier.

That is why I prefer using the light box or V-Ray light over the max lights. You simply check the GI caustics option and you don't have to care about other caustic settings all over the place! Drawback is that you need to have good GI settings for the caustics to be sharp, resulting in longer render times. Another advantage of V-Ray lights or object lights is that they reflect/refract in your objects. Max lights are invisible to camera and reflection/refraction.

So to summarize:
1. If you use only object lights and V-Ray lights and you want caustics:
    - enable GI caustics
    - use good quality GI settings to make sure the caustics look sharp.

2. If you use max lights and you want the light to pass through refractive materials:
    - use the affect shadow option for a fake caustic effect
    - OR enable caustics in the caustics rollout and play with the settings for photon mapped caustics.

3. If you use V-Ray lights and you want photon mapped caustics:
    - Disable affect shadows
    - Disable GI caustics
    - Enable caustics in the caustics rollout and play with the settings.

render time: 0h 0m 39,2s

render time: 0h 0m 43,4s
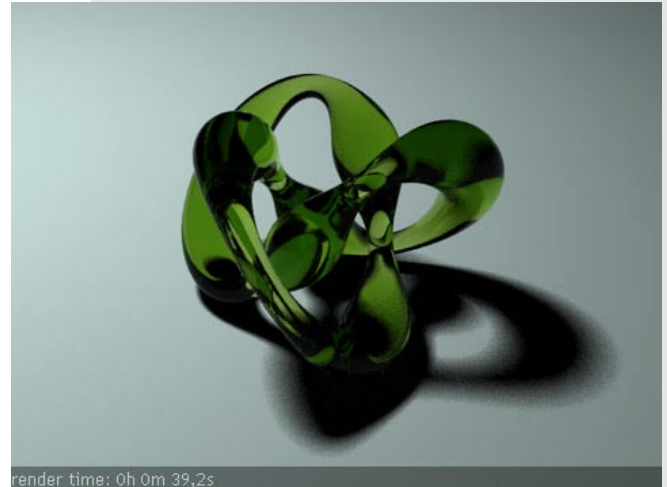
28. Final material

Use the material settings as in the image on the right. I lowered the fog multiplier a bit, and upped the max depth values both to 8.
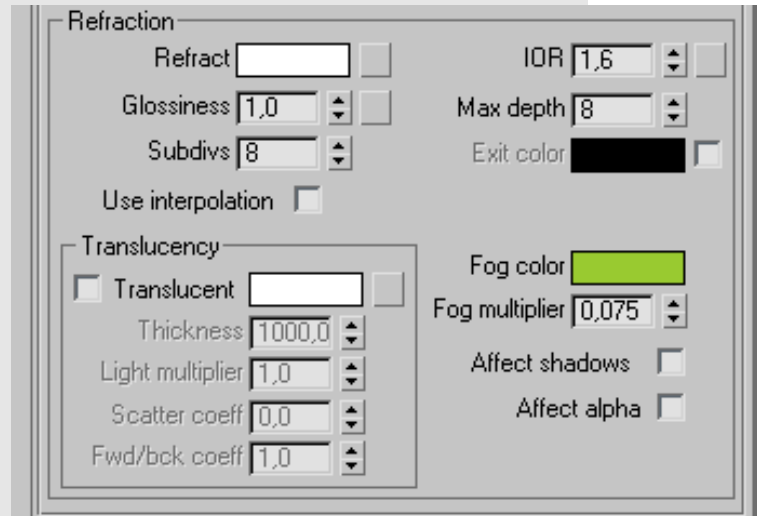
29. Final image setup

In the irradiance map settings, change everything as in the image on the right. Also go to the QMC sampler rollout and change noise threshold to 0.001 for maximum quality.

30. Final image

Render the image, it should look something like mine.

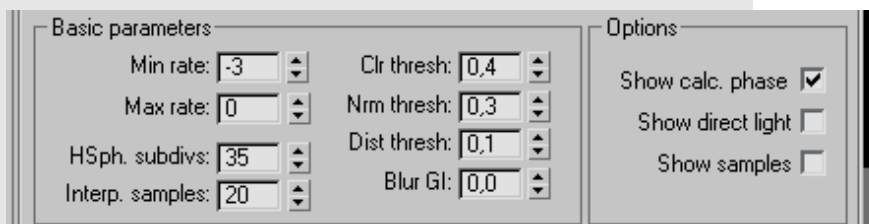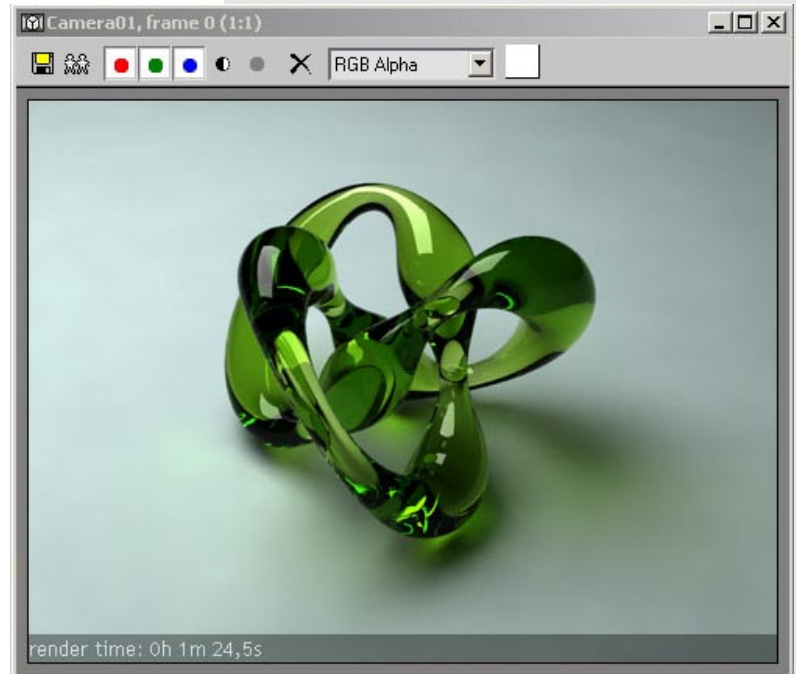Notice the nice caustics and area shadows, controlled by the IR map settings. No caustics were enabled in hard to find places, no time consuming raytraced shadows were needed.

31. Comparison with QMC GI

As a test, I rendered the image with QMC GI instead of irradiance map for first bounce. QMC GI is not an approximate method like IR map with its undersampling algorithm. QMC GI calculates the GI without compromise, every light sample gets equal attention. So it's a good test to compare how well the GI with IR map is computed.

As you can see, in the areas with much lighting detail, the QMC GI image looks better (more physically correct) than the IR map image. But it takes 10 minutes compared to 1 minute 24 seconds for the IR map version... If you want more detailed GI with IR map, you need to edit some of the IR map settings.
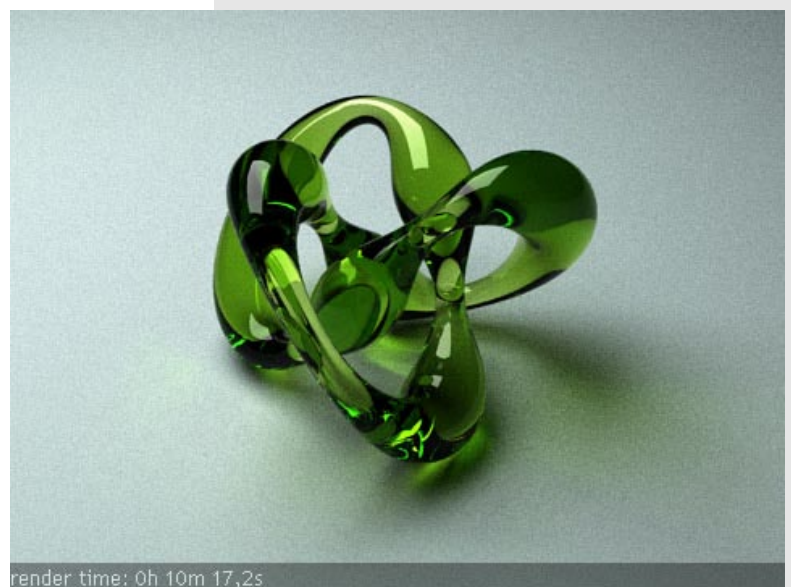
32. Better IR map settings

This last image is rendered with optimized IR map settings. As you can see, this comes very close to the QMC GI example, but without any noise on the floor. I will explain how to optimize the IR map settings in an upcoming tutorial.

render time: 0h 2m 57,2s

This is a new section

1. Translucency

Transparent materials like clear glass or water will let light travel through it undistorted (except for the bending due to the IOR). Translucent materials will scatter the light when traveling through it. For example stained glass, wax, grapes, etc...
Stained glass can be made with V-Ray by using the refraction glossiness parameter, but wax or grapes for example will need the translucent controls. When to use the translucent controls or not, is a but unclear.

Usually translucency is used for really opaque materials in which light can penetrate a certain distance, if it's strong enough. Examples are wax, human skin, orange juice, milk etc...You cannot see through these materials, but light will be able to go through it partially and scatter around. For example when you hold a strong flashlight under your hand, the other side will turn red (blood!) and you can see where your bones are located because they block the light.

2. Translucency in V-Ray

render time: 0h 7m 51,5s
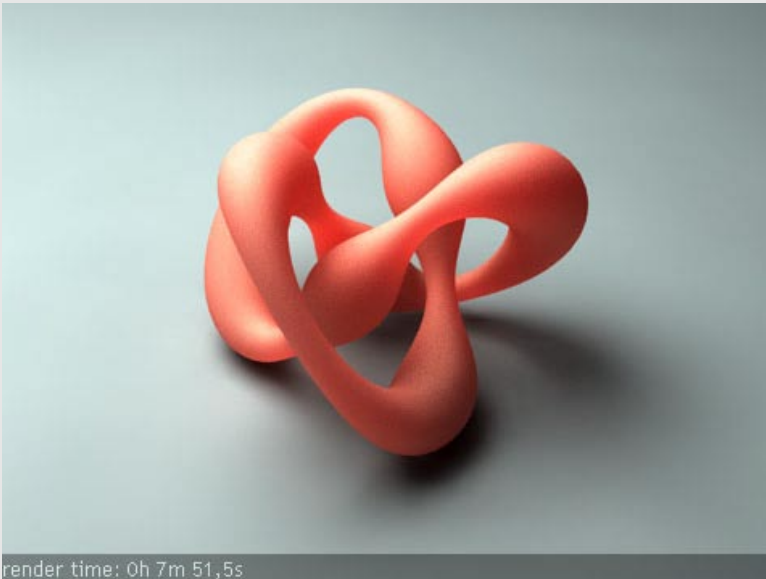
Because the translucency controls are a bit strange in behavior, I will not try to explain them... More technical explanations can be found in the online documents, and I believe the V-Ray team is working on a translucency tutorial...

You can get very similar results with extremely different combinations of settings, but when seen under changing lighting conditions, they will react very differently.

The translucency controls also depend on the refraction glossiness and fog settings. They work together, and especially the fog color is a very sensitive setting that will have a very drastic effect on the material. One thing you should never do, is using colors that have one of their components set to 255!!!

I usually leave the translucency color pure white, the refraction color a grayscale value and then control the material color with the diffuse and fog color. Then with the fog multiplier and trans-lucency light multiplier create various effects of light passing through.

3. Skin

Here's a skin material that you can use to study the settings. Play with it and try to understand what effect each parameter has on the final look. Note that because of the use of both reflection and refraction glossiness, this material will render very slowly, especially with these high subdivs values.
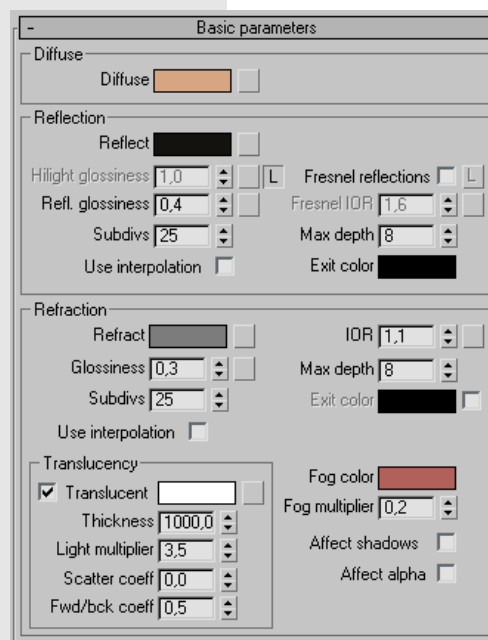
4. Reset all settings from the previous page

In the end of the previous page, all settings were changed for the final image. We need to set it back to test render values now.

Open the render settings dialog and do the following:
- output size to 480x360px
- global switches: turn off default lights
- image sampler to adaptive QMC
- antialiasing filter "Mitchell-Netravali"
- indirect illumination ON
- Secondary bounces multiplier to 0,85
- Irradiance map settings:
    - "low" preset
    - HSph subdivs = 20
- environment:
    - skylight pure white color
    - reflection/refraction pure black, 1.0 multiplier
- system:
    - render region division 50x50px
    - frame stamp: delete all except the render time part

5. Create a chrome material

Create a new V-Ray material and adjust the settings as in the image on the right. This is a basic chrome material setup. Assign this material to the torus knot object and do a quick test render. It should look like my test image.

Now change the reflection glossiness to 0.7 before you continue.
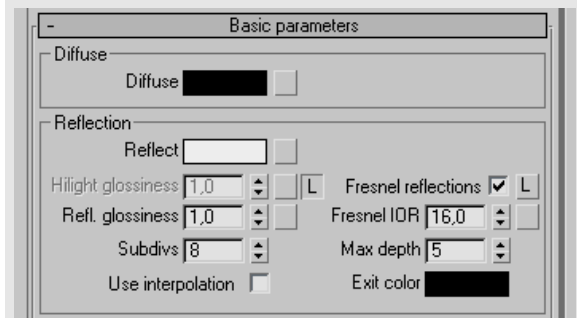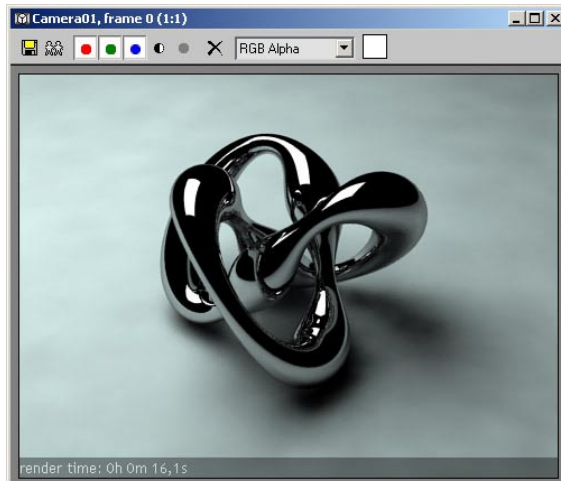
6. BRDF

In this rollout you can choose between Blinn, Phong or Ward shader. The effect of these three types is noticeable the most when using glossy reflections. Render the scene with the three different shaders. The settings affect how the highlights will look like.

Ward is commonly used for metallic materials.
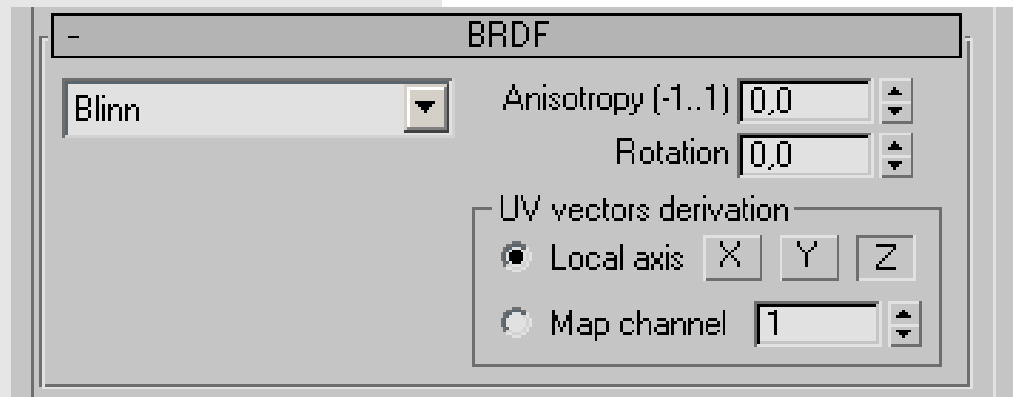
7. Anisotropy

Anisotropic reflections are reflections stretched in some direction. You see this often on brushed metals, for example the bottom of cooking pans. The anisotropy setting controls the shape of the highlight.
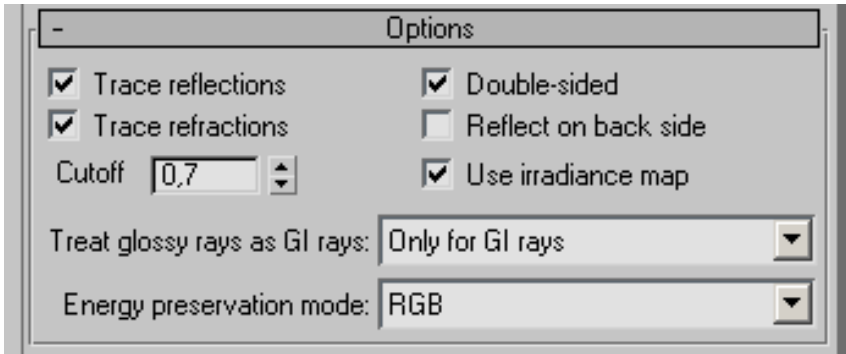
The torus knot is not the best example, but you'll get the point.

Change the anisotropy setting to -0.6 and render the image. There's also a huge difference between Blinn/Phong/Ward here. Try some other values too (like +0.6 for example).

The XYZ axis option allows you to change the direction of the reflections, or you can use a mapping channel instead. The rotation parameter rotates the reflections...

8. Options rollout

First set anisotropy to 0.0 again, and also refl glossiness to 1.0.

Trace reflections and trace refractions are pretty simple; turn calculation on by checking check box or off by unchecking check box.

The cutoff parameter is a threshold value for V-Ray to trace reflections any further or not. Try a value of 0,7 on the current image. Increasing the threshold can speed up rendering when you are using lots of reflections in the scene.
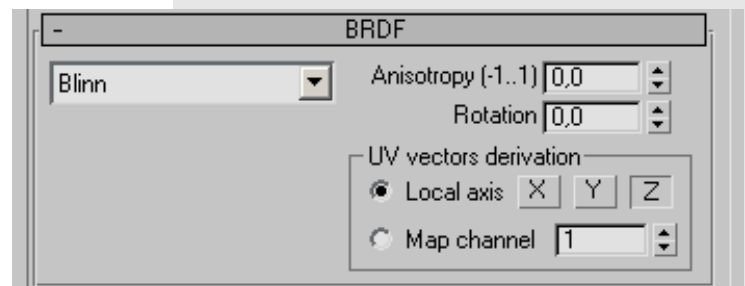
Double sided: please refer to the manual.

Reflect on backside. We used this option already on page 2 of this tutorial. If turned on, reflections for back facing surfaces will be computed too.

Use irradiance map: if you turn this off, the irradiance map will not be used on this material. Instead, the GI on this material will be computed with QMC GI. This can be useful if the irradiance map blurs out small shadow details on certain objects.

Treat glossy rays as GI rays: please refer to the manual. Energy preservation mode: please refer

9. Maps rollout

The maps rollout sums up all different texture maps. Almost all maps can be accessed in the basic parameters rollout (the small squares next to the parameters), but some will appear only here.

These are the last four maps: bump, displace, opacity and environment.

Bump allows you to render irregularities in the surface by using a map. Dark areas in the map are 'low' areas, bright areas are 'high' areas.

Displacement is like bump, but instead of fake rendering it, the actual mesh is deformed to create the irregularities. Refer to the manual for extensive tutorials and examples about displacement.

Opacity is the same as you are used to in standard max materials.

Environment slot allows you to use different reflect/refract environment for each material.

10. Reflect/refract interpolation

These rollouts contain parameters to control reflect/re-
fract interpolation. These are only needed if you ticked
the 'use interpolation' check box in the basic parameters
rollout. I don't recommend using interpolation for glossy
effects. If you do want to use them, please refer to the
manual for more detailed information.

Reflect interpolation	
Min rate: -3	Max rate: 0
Clr thresh: 0,25	Interp. samples: 20
Nrm thresh: 0,4	
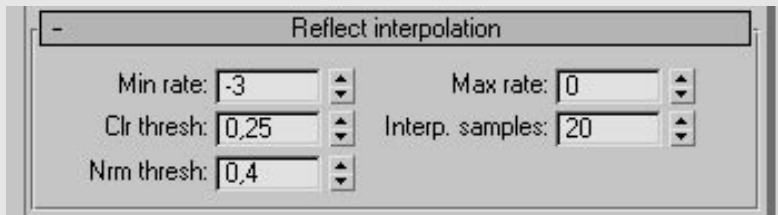
About the author

Wouter Wynen has studied product development for 5 years at the university in Antwerp, Belgium. During these years, his interest in 3D modeling and visualization grew more and more. In the end, it even overpowered the interest in product design.

After graduation, he founded the company Aversis, offering 3D viz & webdesign services.

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