# Correct use of finish statements

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After many years of coding, the realistic finish has never been my best point. How could I fix the unrealistic finish of these spheres? The more I look at them, the more "fake" they look on the image. I can't find the right combination of ambient, radiance and brilliance.

pd, the source for the Red Sphere:

```
texture {
  pigment { Red
        }
  finish { specular .5
        metallic
        ambient .2
        diffuse .5
      }
  }
```
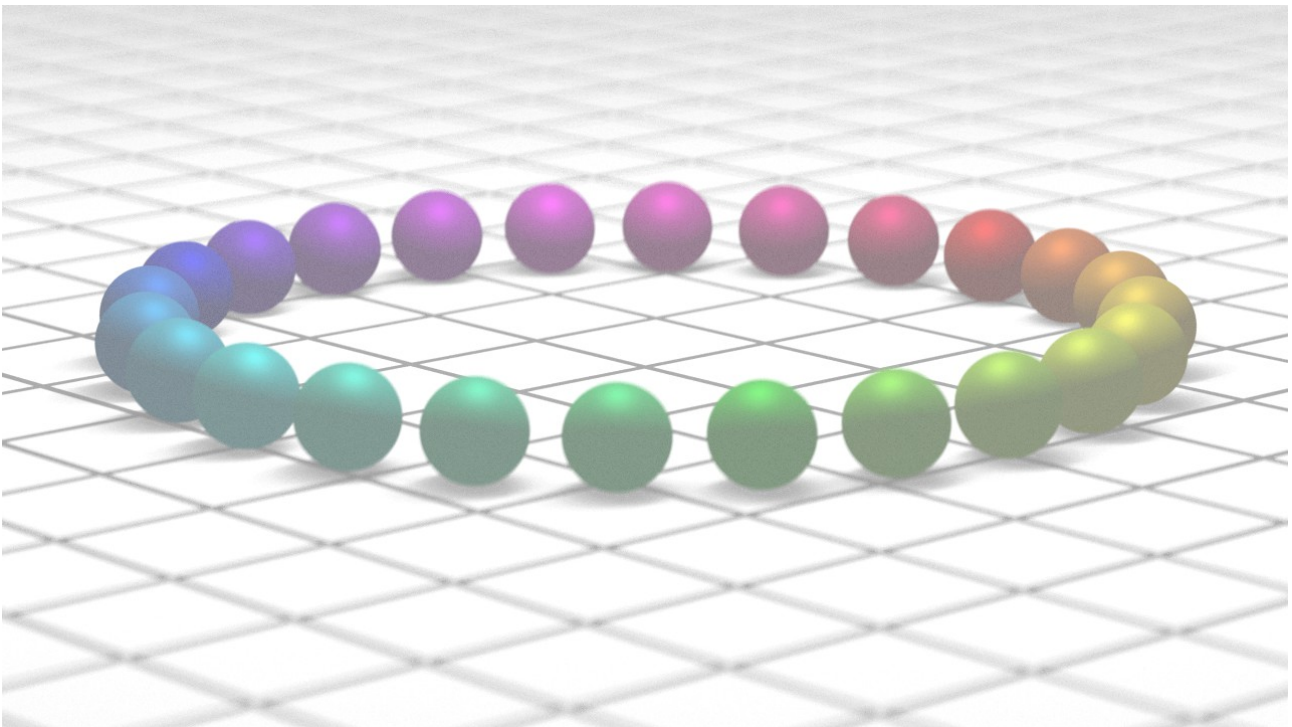

Clipka:
Ambient: Never looks realistic. Ditch it. Use radiosity instead (which as of `#version 3.7` disables ambient; if you need emissive surfaces, use `emission` in the finish).

Brilliance: Unrealistic hack. Forget it.

Radiance: Don't know what you mean by that in this context.

`metallic` is only reasonable for metals, special metallic paints, or plastic with metal particles.

Whenever you use `specular` (or `phong`), technically you should also use `reflection`, and make sure that the parameters correspond well. In practice this means that you should always use the `specular albedo N` syntax, where N is the same value as in `reflection`, and you should use very low `roughness` because official POV-Ray can't do rough reflections (you'd need UberPOV's blurred reflections for that). If you need dull surfaces, either turn off highlights entirely, or use micronormals to control the effective roughness for both reflections and highlights.

If you use reflections (and, as stated above, you always should wherever you use highlights), you should use either `fresnel on` or `metallic on` in the reflection block (don't forget to set an ior; even opaque materials have one). To keep highlight parameters in sync, you should also use `fresnel on` or `metallic on` in the finish block itself.

Make sure the material doesn't reflect more light diffusely than it receives. The easiest way to accomplish this is to use the `diffuse albedo FLOAT` syntax, and make sure the parameter doesn't exceed 1.0.

Make sure the material doesn't reflect more light as highlights than it receives from light sources. The easiest way to accomplish this is to use the `specular albedo FLOAT` or `phong albedo FLOAT` syntax, and making sure the sum of specular and phong doesn't exceed 1.0.

Make sure the material doesn't reflect more light in ANY way than it receives from light sources. If you're using `fresnel on` (or, IIRC, `metallic on`) at the finish level, this is as easy as following the above two rules. Otherwise, stick to the `albedo` syntax and make sure the sum of diffuse, specular and phong doesn't exceed 1.0 either.

Virtually all truly diffuse materials exhibit some level of subsurface light transport. Do make use of the corresponding feature. Since this automatically applies a fresnelian effect to the diffuse component, you should use `fresnel on` at the finish level to also apply a corresponding fresnelian effect to highlights.

Virtually all dull materials still do exhibit specular highlights and reflections, even if you don't realize it. Try to model those as such: Use reflection and highlights (see above), and use micronormals (or UberPOV) to achieve the diffuse-ish effect resulting from the surface roughness.

Reflection requires something to reflect. Always make sure you have interesting surroundings for your objects to reflect (a HDRI sky sphere does nicely).

And:
I post an image for your reference,

```
sphere{
  <0,0.14,0.3>, 0.14
  texture{
    pigment{rgb<0.19,0.18,0.19>}
    finish{ambient 0 diffuse 1 brilliance 1.5 reflection {0.01,0.2 falloff3}}
  }
}
```