Subject: Anodizing Stainless Steel Models
Posted by DavidAlan on Sat, 17 Oct 2009 04:29:04 GMT
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Hi everybody. I was wondering if anyone had any advice on where I could find someone to color anodize some of my models that I'm getting printed in stainless steel. So far, the only things I've been able to find on my own are mass production factories, with couple hundred dollar minimums. In general, I just want to color the metal, and still have it be metal (if that makes any sense). Any advice? Anyone? Bueller?

Subject: Re: Anodizing Stainless Steel Models
Posted by joris on Sat, 17 Oct 2009 17:08:31 GMT
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David,

why would you like to anodize the metal? Which colors or finishes would you like it to have? What do you aim to do with the model?

Joris

Subject: Re: Anodizing Stainless Steel Models
Posted by cooldjez on Sat, 17 Oct 2009 17:54:12 GMT
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I have been looking into the same thing. I would like to color the metal black (PVD). As this is popular in watch cases I thought it would be cool to produce rings and cufflinks in black.

I also found companies who could help be, but because of the low volume the costs are way to high.

I am very curious to hear if anyone has tried to 'blue' the SS material. Normal stainless steel alows you turn it blue when you heat it up very carefully with a torch. This is the way how they make the blue screws in watch movements.

Subject: Re: Anodizing Stainless Steel Models

Posted by cooldjez on Sat, 17 Oct 2009 17:58:29 GMT
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Just thought of something else.

Joris, if you ever make titanium available to everyone, coloring will be easy. Titanium reacts to different currents. So you can turn it a whole range of colors.

http://www.wikihow.com/Color-Titanium

Subject: Re: Anodizing Stainless Steel Models
Posted by {DF} on Sun, 18 Oct 2009 07:53:03 GMT
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To color a metal (any metal..) correctly, you need to use chemical acids.
The best you can do, is to find an art restorer specialized in sculpture.

Every metal needs a unique chemical acid for a unique color. The process is complex and you need a person who knows what he is doing when dealing with acids.

I 've been working with such a person once. He was an art restorer and could turn any metal to any color using acids. He even had a color palette for this, a huge one, for his customers to choose. He is an art restorer, but I suppose any good art restorer is capable of doing this. At least a part of it...

Subject: Re: Anodizing Stainless Steel Models
Posted by joris on Mon, 19 Oct 2009 09:55:46 GMT
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Cooldjez,

Titanium is ridiculously expensive. It is 40-50 times more expensive than the other processes. So..uum..if you guys really really want it we could look into it. But, for the moment my assumption is that we won't sell a lot of it.

There are a lot of different finishes that we can do with the steel. I will look into anodizing our materials and what we can do with that.

Joris

Subject: Re: Anodizing Stainless Steel Models
Posted by cooldjez on Mon, 19 Oct 2009 14:42:58 GMT
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Just to get this clear.

SS = $10 per 1cm3
Titanium is between $400 and $500 per 1cm3?

If this is the case I won't bother you guys about Titanium again. For that kind of money I will go gold (even at current prices) every time.

Steven

Subject: Re: Anodizing Stainless Steel Models
Posted by Youknowwho4eva on Mon, 19 Oct 2009 16:20:51 GMT
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What if we go the opposite direction in price? Like Aluminum.

Subject: Re: Anodizing Stainless Steel Models
Posted by joris on Tue, 20 Oct 2009 14:16:04 GMT
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I still think titanium is a nice material and it is used a lot in jewelery. But, I currently do not believe that we can get the price down to a level that would work for you guys.

Subject: Re: Anodizing Stainless Steel Models
Posted by Fingers on Tue, 20 Oct 2009 18:00:47 GMT
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Have you looked into chemical Bluing? Depending on location you may be able to find "cold bluing" kits intended for touching up blued gun metal.

Subject: Re: Anodizing Stainless Steel Models
Posted by GlenG on Wed, 21 Oct 2009 01:46:52 GMT
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OK folks here is what I know about coloring the Shapeways SS.
SOME commercially available "Patina" solutions for coloring copper or bronze will work. But I would not recommend them for use on objects worn in close contact with the skin (like finger rings!) Good results are gotten from Birchwood-Casey Co. products. Please note: ONLY use the coloring agents formulated to produce shades of brown or black. The products formulated to produce antique green shades will not work and will produce a rusty mess. These solutions are often available from jewelry supplies also from gunsmithing suppliers. These chemicals are easy to use, they require no heat, they work almost instantly and are reasonably safe to use.

Heat coloring is a better choice though. This costs nothing. No chemicals, and the results are actually more durable than the chemicals mentioned above.
A lovely red brown will start to appear at around 350º C this color will deepen and darken as temperature increases. Eventually a grey/black will occur. To begin, object must be clean, and free of all skin oils, they should also be dry (no water spots). Heat must be applied slowly and evenly. A torch or stove burner will work. If you manage to get the object red hot the resulting color will be in the black range. Be careful as at these elevated temperatures the metal will begin to form "fire scale" which is a hard flakey oxide that is not very attractive and very difficult to remove.

No matter what method you use keep in mind these "coatings", which are actually thin films of oxides, are subject to abrasion and will eventually wear away from convex surfaces leaving bright metal. This would be true of plated surfaces as well.

Hope this helps a little, go have fun, but use common sense and be careful.

-G

Subject: Re: Anodizing Stainless Steel Models
Posted by DavidAlan on Wed, 21 Oct 2009 03:29:37 GMT
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Awesome! I got Jorus' attention.
Well, initially my hope for anodizing is for my lantern rings based on the green lantern comic books. I'm still finishing up the rest of the models, but essentially there are going to be 7 different

ring rings, one for each color of the spectrum (red, orange, yellow, green, blue, indigo, violet) plus black. Usually, if I find a green lantern ring for sale, it's either just in silver, with some green accent crystal or enamel, or it is painted, and not suitable to wear. So initially, I'd like to be able to get my rings colored, but still wearable. Wether it's polished or textured, I don't particularly care, at least at the moment. It'd be cool to be able to offer it as an option to sell. Heck even to be able to make a piece in stainless steel that is either silver or "gold" colored would be cool. I've seen a couple pictures of jewelry by other artists like Madox and Bulatov that they've got their metal pieces color anodized.

Subject: Re: Anodizing Stainless Steel Models
Posted by derekh on Thu, 12 Nov 2009 02:15:33 GMT
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Hey David,

I find myself in pretty much the same situation. I have been considering powder coating my rings to get all the different colors of the Lantern spectrum's.

I also had some thoughts as to using a combination of tinted transparent resin with various colored glow in the dark powders worked in for use in the recessed areas of my rings to give it a glow in the appropriate color.

Regards,

Derek

Subject: Re: Anodizing Stainless Steel Models
Posted by DavidAlan on Thu, 12 Nov 2009 07:45:22 GMT
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I just got a similar thought today, to putting on a clear tinted resin coating. The idea came to me when I got a paperclip that was blue but metallic looking, and I realized it was in a clear blue "sleeve." I can honestly say that using glow in the dark powder didn't occur to me, although I have made a couple of models with space for an LED. I haven't put those up on my store yet though, because I wanted to figure out space for some sort of switch/battery compartment.

Subject: Re: Anodizing Stainless Steel Models

Posted by joris on Thu, 12 Nov 2009 09:40:01 GMT
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Powder coating and coating in general would seem to be easier to implement.

But, would you guys prefer information:

ie powdercoating tutorial, anodizing tutorial

or

would you like us to offer this?

Subject: Re: Anodizing Stainless Steel Models
Posted by Youknowwho4eva on Thu, 12 Nov 2009 13:37:56 GMT
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Powder coating is definitely a process. Or at least the method I know of for powder coating out door furnishings. Involved shot blasting, chemical dip, the coating. May be scaled down when your not coating park benches but the line I saw was huge.

Subject: Re: Anodizing Stainless Steel Models
Posted by DavidAlan on Thu, 12 Nov 2009 15:34:49 GMT
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Well I know I would definitely prefer anodizing, as it still gives you a metallic look and feel. Powder coating usually ends up looking like shiny plastic. I've read plenty of tutorials about it, but it's not really a process that's easy to do at home. It would be awesome if you could offer it. I'd settle for anodizing being outsourced to someone else though. Or is it possible to add color during the printing process?

Subject: Re: Anodizing Stainless Steel Models
Posted by derekh on Wed, 09 Dec 2009 13:33:08 GMT
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I don't really see anodizing as being a permanent solution, everything I have seen that is done that way fades quickly with wear, and while it may provide the "metallic" look, it is temporary at best.

Anyways, these are the options I have been considering recently, and have no idea which (if any) would be viable for this application.

1.) Powder Coating - It appears to be far less labor intensive than originally thought. They make small kits that only require small amounts of time in a toaster oven to cure, and are fairly low in cost.

Powder Coating

I have seen other powder coating kits that are much lower in price, around $130 or so.

2.) Plating - This seems to be the cheapest option, but unfortunately has little in the way of colors.

Would work for Sinestro Corps and possibly Orange Lantern styles.

Plating

3.) Painting, other types of applied coatings, etc... - Apparently, some of these items are epoxies that are incredibly durable, and are available in a huge variety of colors, but having never used any, I can't say how durable/safe they would be for jewelery items.

Other Coatings

One would think that with the technology we have today one of these options would be workable for use on jewelery.

(I am also currently trying to get some of my items cast in silver, since that is wearable without all the hassle. They may not be colored, but at least they could be worn.)

Subject: Re: Anodizing Stainless Steel Models
Posted by DavidAlan on Fri, 15 Jan 2010 19:01:32 GMT
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Hey, I was looking around, and found a link heat coloring stainless steel.

According to this site, you can color stainless steel just by throwing it in the oven, and depending on the temperature, you get a different color:

Pale Yellow----------300°F
Bright Yellow----------350°F

Straw Yellow----------400°F
Dark Straw Yellow----------425°F
Bronze----------450°F
Purple----------475°F
Violet----------500°F
Dark Blue----------525°F
Light Blue----------550°F
”Clear” (Very Light) Blue-----575°F

There's a picture at the bottom of the link with a gradient colored piece of steel. I was thinking of creating some test ingots to see what temp my oven gets what color.

Or, maybe this kind of testing has already been done with the Stainless Steel material, and Joris or someone can provide some insight. Either Way, I think I'm going to give this a shot.

Subject: Re: Anodizing Stainless Steel Models
Posted by Wolfdagon on Sat, 16 Jan 2010 06:25:31 GMT
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Once I figure out how to model the rings (I'm getting closer) I think I am going to try this with powder coating.

The place that I work has two large powder coating lines where they coat the outer shell for water heaters. Unfortunately, none of the colors they use would look very good on any kind of jewelry, or I would just take it to work and let them do it. Also, they can't just throw in a new color for me because it would contaminate the paint that they are using.

I have been looking at diffent colors though and have found what I think would be perfect for each ring. I hope to use some of the overtime money that I am currently getting to get everything to give this a try.

But if someone beats me to it I would love to see the results.

Subject: Re: Anodizing Stainless Steel Models
Posted by GlenG on Tue, 19 Jan 2010 03:25:43 GMT
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Hi all,
I think the "temper color" chart you are quoting from is for carbon steel? Temper colors will

form on most stainless alloys, but at a much higher temp than for plain carbon steels. For example a brown/bronze color forms at around 450º F on carbon steel but it takes 734º F to form on stainless. Go to this link for the data on SS heat colors:
http://www.bssa.org.uk/topics.php?article=140

Another thing you need to understand, the SS that Shapeways offers is actually a composite of stainless steel and bronze. This fact skews all the data on standard temper color charts. It will take some experimenting to achieve the coloration you are seeking. And you might not have as broad a color range as compared to other conventional ferrous materials. I have achieved very nice antique bronze shades on SW prints at around 650º F. Dark bronze with reddish purple highlights appear at around 700ºF. This is beyond the range of a kitchen oven but it can be done with a hand torch. You need to be careful so as to get an even heat. Do it slowly, keeping the flame from directly kissing the metal surface. Also, the surface condition of the object will effect outcomes. Better results are obtained if the parts are polished up a bit. A critical factor is that the object must be scrupulously clean and dry before starting the heat treatment. Wash parts well with a degreaser, rinse and dry. Wear rubber gloves, as even finger prints can muck up the process.
Good luck, this ain't rocket science just follow the rules and be careful. A coat of clear lacquer and/or conservators wax is a good idea as well. Have fun with it.

-G

Subject: Re: Anodizing Stainless Steel Models
Posted by Architect on Wed, 18 Jul 2012 08:10:21 GMT
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has anyone considered titanium plating their stainless artifacts? I know there is a Japanese company that developed a way to do this, at relatively low temperatures. the patent for it reads something like this.

PURPOSE:To form a dense and uniform Ti plating film at low temp., by carrying out electroplating in a dry and oxygen-free atmosphere by using a plating bath composed of Ti chloride, alkylpyridinium halide, and specific organic solvent and also using direct current or pulse current. CONSTITUTION:Electroplating is applied to the cathode to be treated in an oxygen-free atmosphere of dry N2, Ar, etc., by means of direct or pulse current in 0.1-10A/dm<2> current density by using a soluble anode made of Ti and also using, as a plating bath for Ti electroplating, a molten salt plating bath consisting of 50-80mole%, in total, of one or two kinds among Ti chlorides, such as TiCl3 and TiCl4, 20-50mole% of 1-4C alkylpyridinium halide of alkyl proup, and <=75vol.% of organic solvent, such as toluene, xylene,

and benzene. At this time, by using the plating bath of the above composition, the dense and uniform Ti plating film can be formed by means of a plating bath with a relatively low temp. of 20-150 deg.C without causing oxidation.

I know this sounds like a complex issue, but I am betting some one is doing this already, and could probably rack up stuff when they do a batch plate of their own stuff, so they should be able to plate your stuff if you wait for that, for the cost of basically the extra paperwork, and sorting to make sure it gets shipped to you, and not with their batch to the people who paid for their items. (or get buddy buddy with some one who works there XD)

as for titanium chloride, I have ruined parts I was trying to anodize when I started by electrocuting it to long and using salt (sodium chloride) as my electrolyte. Works fine for bronze or brass color but anything more takes time and that chloride attacks the cathode and makes the tetrachloride which then passes through the water and gets deposited on the part being anodized, leaving a grey scale on the part. definitely a build up too, Since I have xylene here I may have to try plating some 316L with some titanium, tho, and if I get any decent results I will pop back on here and give details, should anyone want them.

titanium is not to expensive on ebay if you know where to look, and are just plating things with it, so if it works, it should be a good alternative for people here. heck I have tons of scrap titanium from making my goggles, heh heh, write me over at my web site if you want me to give you some scraps to experiment with, (www.borgsteamfactory.com/contact.html)

until I have some info, later. and good luck all.

ps, I found that the titanium was easy to anodize in just coke a cola (I used diet coke personally) to avoid the scale and chlorine issues, but use it straight, no dilution, unless you have been using it a while and the water has been evaporating out of it, then use distilled water to avoid getting chlorine in the mix.)

Subject: Re: Anodizing Stainless Steel Models
Posted by Architect on Wed, 18 Jul 2012 09:18:35 GMT
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Glen, you are right for sure, Also note though for those experimenting, you can go up in heat and color change, so go slowly checking inbetween each temp change. the hotter it gets the more oxygen is being deposited on the surface, the heat will add more, but removing it if you go to far, is going to require sanding or some other abrasive process that will remove some of the stainless. so best to go slow and take your time, than to rush and have to destroy your part due to over heating it.

Subject: Re: Anodizing Stainless Steel Models
Posted by Architect on Fri, 20 Jul 2012 00:56:40 GMT
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oh I was just remembering, I used a heat gun to heat up titanium to color it. I am betting this would be closer to the temp range that you want for stainless steel like the rings. good ones with a tiny tip for concentrating the hot air will bring the temp to and exceed 1000ºF so it should get you where you need. however you may have to experiment with how long to heat it, and maybe use a hole punch and relive some of the sides of the tip nozzels to get different temperatures for precise heating and coloring.

still working on the titanium coating for metals, but I have had some pretty good success with the formation of the $TiCL^3$ so....

Subject: Re: Anodizing Stainless Steel Models
Posted by RatherDashing on Fri, 30 Nov 2012 19:27:17 GMT
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Coming from a paintball background, we anodize parts a vast array of colors, but there is one fundamental flaw in your question...You can't anodize steel, it is a process for aluminum mainly. There is sort of an ano process for steel, but only black that I know of. Also, there is no true "white" color for anodizing if you wanted that route anyway. Duracoat and powdercoat are good options (duracoat is thinner I believe).

Subject: Re: Anodizing Stainless Steel Models
Posted by stop4stuff on Fri, 30 Nov 2012 22:38:05 GMT
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psst... look at the dates