Subject: New Metal Options?
Posted by nancyliang on Thu, 14 Jun 2012 12:44:16 GMT
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Hey guys,

We are looking into new metals for you guys. These will likely be wax-printed then casted metals, though we're also looking into other printing options like DMLS.

I created a poll to get a sense of the most in-demand metals. Let us know what you'd like to see on Shapeways!

Also, let us know at what price point (say for this ring or these cufflinks) would you be willing to pay for your favorite materials?

Some of these materials may be in high demand, but currently priced too highly given the technology--so we want to make sure to work towards good choices for everybody at a good price point for everybody!

Thanks,
Nancy

New Metal Options(total votes: 62)

Aluminum 25/(40%)
Brass 13/(21%)
Bronze 5/(8%)
Gold 6/(10%)
Nickel 1/(2%)
Platinum 0/(0%)
Titanium 9/(15%)
Other (respond in forum thread) 3/(5%)

Subject: Re: New Metal Options?
Posted by stonysmith on Thu, 14 Jun 2012 13:23:11 GMT
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Nancy, do any of these materials allow finer resolution than the plastic materials?

Subject: Re: New Metal Options?
Posted by BillBedford on Thu, 14 Jun 2012 13:29:36 GMT
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1/ Cast Nickel-sliver
2/ Any DMLS

Subject: Re: New Metal Options?
Posted by Agent24 on Thu, 14 Jun 2012 13:45:55 GMT
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Cast Iron was what interested me

Aluminium and Titanium also sound useful.

Subject: Re: New Metal Options?
Posted by lensman on Thu, 14 Jun 2012 13:54:58 GMT
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I voted bronze.... love that metal with the option for me to hand finish and make it almost gold-like, or to give it an aged patina. Also, the price-point should be good; much cheaper than silver.

Second choice would have been aluminum which I see is popular.

I think gold, platinum and titanium are just going to price themselves out of most orders here; gold is just a stupid price right now and never seems to go down.

I think the key thing to keep here is the fact that the metal is cast from a 3D printed wax mold. Although I like stainless steel the printing "rules" and often obvious printing lines keep me from using it a lot.

Direct Metal Laser Sintering is all well and good if the resolution allows for a "clean" print.

Glenn

Subject: Re: New Metal Options?
Posted by stop4stuff on Thu, 14 Jun 2012 14:53:01 GMT
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I'd like to vote for two - Aluminium and Brass, but I can't, so will just go for Aluminium. My reasons for both, Aluminium for heatsinks and Brass for Steampunk items.

As for price point for the two items, are they printable in the materials available now (images look like renders) and what kind of specs would sizing & wall thickness come is at?

Subject: Re: New Metal Options?
Posted by cadalu on Thu, 14 Jun 2012 15:38:58 GMT
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I voted for brass but I would also REALLY love nickel, bronze and aluminum..

I would guess at a price point somewhere between steel and silver.

We definitely need a white metal option, aluminum or nickel, that gives us more detail than stainless and without the brass color infusion that stainless currently offers.

I'm really excited at the prospect of new metals!! I've been laser cutting aluminum lately and would love to move to 3D on the material.

Subject: Re: New Metal Options?
Posted by BillBedford on Thu, 14 Jun 2012 15:40:43 GMT
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If these new metal are to be cast then the spec are going to be much the same as the silver ones. The limiting factor is the wax.

Unless of course SW find another foundry to do the casting.....

Subject: Re: New Metal Options?

Posted by nancyliang on Thu, 14 Jun 2012 15:44:37 GMT
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For Aluminum, Brass, Bronze, Gold, Platinum--we can opt for wax + casting solution. So the design rules would be closer to Silver rules.

For Titanium, we would go for DMLS. Pros: super fine detail, super thin walls. Cons: very pricey, and limited in geometries. Steep overhangs would either be rejected (eliminating a lot of designs) or the price would increase dramatically. So yes you can get super thin walls/details, but it comes with restrictions in other areas.

Hope that helps paint the options a bit more clearly?

Subject: Re: New Metal Options?
Posted by lensman on Thu, 14 Jun 2012 15:55:16 GMT
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Yes, Titanium offered by one of your competitors is way out of my price league...

Subject: Re: New Metal Options?
Posted by pfeiffer stylez on Thu, 14 Jun 2012 16:03:12 GMT
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How about a "White Metal" alloy ?

Subject: Re: New Metal Options?
Posted by olasogaard on Thu, 14 Jun 2012 16:32:59 GMT
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Bronze, brass, aluminium, pewter, lead-less white metal - all will do.

Is "detail as FUD, cost less than stainless steel" doable?

Subject: Re: New Metal Options?
Posted by TimberWolf on Thu, 14 Jun 2012 19:54:56 GMT
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I am looking forward to Aluminium and Titanium, actually, provided that the allowed detail is finer than the current Stainless Steel process

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Subject: Re: New Metal Options?
Posted by Youknowwho4eva on Thu, 14 Jun 2012 20:03:24 GMT
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I'd like (lead free of course) pewter.

Subject: Re: New Metal Options?
Posted by stannum on Thu, 14 Jun 2012 20:54:13 GMT
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BillBedford wrote on Thu, 14 June 2012 15:40 UTCIf these new metal are to be cast then the spec are going to be much the same as the silver ones. The limiting factor is the wax
nancyliang wrote on Thu, 14 June 2012 15:44For Aluminum, Brass, Bronze, Gold, Platinum--we can opt for wax + casting solution. So the design rules would be closer to Silver rules.
So it would need a polished option and it would still look rough in the hard to reach zones. No idea if asking for pewter is worth it then, based in what is already produced in pewter by more traditional means.

Subject: Re: New Metal Options?
Posted by stop4stuff on Thu, 14 Jun 2012 22:04:22 GMT
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Rough in the hard to reach areas means more surface area for Aluminium heatsinks

Alas, not so good for other metals and designs.

Subject: Re: New Metal Options?
Posted by stannum on Thu, 14 Jun 2012 23:31:59 GMT
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It's a interesting thought, but if roughness really helps, every maker would already rough their heatshinks. Some kind of scratching, stamping or etching should do.

Based in current IC and bigger heatshinks having rather smooth surfaces, there must be a reason against. Maybe roughness traps a small air layer. Or maybe more dust get trapped sooner. An insulated surface isn't good.

Subject: Re: New Metal Options?
Posted by Roy_Stevens on Thu, 14 Jun 2012 23:39:55 GMT
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I don't remember this poll, but I'd really like brass or any metal comparable to Silver without the added price of a precious metal. Aluminum is too light, pewter too soft for my purposes. Brass looks really nice as jewelery when polished, but it does need to be clear-coated to avoid oxidation. A really nice option would be optional gold electroplating for silver and brass like you offer for SS.

Subject: Re: New Metal Options?
Posted by Agent24 on Thu, 14 Jun 2012 23:55:55 GMT
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johnnylingo wrote on Thu, 14 June 2012 23:39I don't remember this poll

That would be because this thread was only made yesterday.

Subject: Re: New Metal Options?
Posted by stop4stuff on Fri, 15 Jun 2012 13:16:41 GMT
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stannum wrote on Thu, 14 June 2012 23:31It's a interesting thought, but if roughness really helps, every maker would already rough their heatshinks. Some kind of scratching, stamping or etching should do.

Based in current IC and bigger heatshinks having rather smooth surfaces, there must be a reason against. Maybe roughness traps a small air layer. Or maybe more dust get trapped sooner. An insulated surface isn't good.

I don't think it is practical to reach in between the vanes of a milled heatsink to rough up the surfaces, but fact is more surface area means more heat transfer to air - I have several 'heatsink'

projects in mind and not necessarily for cooling, but more like heat transfer. Just think how much drilled heatsinks for water cooled applications cost, we might have the opportunity (as designers) to come up with some rather special heat exchange devices

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Subject: Re: New Metal Options?
Posted by wiwa on Mon, 18 Jun 2012 06:03:51 GMT
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As mentioned earlier, DMLS would be mind blowing. It can do the same designs as SLS, in full density metal.

Titanium would be extremely expensive (like the current silver prices or more); but stainless 17-4 would be very reasonable, with the economy of scale the price would be like the current stainless price but with much greater flexibility and improved performance.

The economy of scale would be readily apparent, DMLS with stainless can replace so many slow and expensive processes typically used for metal parts, like forging, milling, stamping, and drawing. Plus it has unlimited possibilities and you can do stuff like captive and floating parts, the stuff that you see being done with the plastic parts now.

Subject: Re: New Metal Options?
Posted by wiwa on Mon, 18 Jun 2012 06:08:56 GMT
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stannum wrote on Thu, 14 June 2012 23:31It's a interesting thought, but if roughness really helps, every maker would already rough their heatshinks. Some kind of scratching, stamping or etching should do.

Based in current IC and bigger heatshinks having rather smooth surfaces, there must be a reason against. Maybe roughness traps a small air layer. Or maybe more dust get trapped sooner. An insulated surface isn't good.

It depends on if you are using forced air like a fan. If you have longitudinal flow along the surface of the heatsink you want it to be smooth, or at least smooth in the direction of airflow. If you are relying on natural convection you want it to be rough just to maximize surface area. Remember the chart for Reynolds number, there is a big knee going from still air to moving air.

Subject: Re: New Metal Options?
Posted by wiwa on Mon, 18 Jun 2012 06:17:58 GMT
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nancyliang wrote on Thu, 14 June 2012 15:44For Aluminum, Brass, Bronze, Gold, Platinum--we can opt for wax + casting solution. So the design rules would be closer to Silver rules.

For Titanium, we would go for DMLS. Pros: super fine detail, super thin walls. Cons: very pricey, and limited in geometries. Steep overhangs would either be rejected (eliminating a lot of designs) or the price would increase dramatically. So yes you can get super thin walls/details, but it comes with restrictions in other areas.

Hope that helps paint the options a bit more clearly?

(see above message about titanium vs stainless in DMLS) There would be many more people looking for precision, pure stainless parts than titanium parts, especially at titanium prices. Plus at small scale the weight difference is really outweighed by the strength of stainless vs titanium

Also, DMLS has literally the same limitations as SLS - powder bed supports thin wires and overhangs. Some of the most ridiculous shapes have been made with the DMLS process, because the strength of metal means you can use much thinner supporting members than plastic.

Subject: Re: New Metal Options?
Posted by wiwa on Mon, 18 Jun 2012 06:24:52 GMT
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olasogaard wrote on Thu, 14 June 2012 16:32Bronze, brass, aluminium, pewter, lead-less white metal - all will do.

Is "detail as FUD, cost less than stainless steel" doable?
Well, cast aluminum would have the same detail as silver. But aluminum costs 1/430th as much as silver. So if we extrapolate that out to the silver price on Shapeways, that would be 1.8 cents per cubic centimeter - that's pretty cheap right? Plus, you could do more interesting designs in aluminum - because it's stronger than silver.

Edited: Actually I did not factor in the density of both metals. The ratio is actually 1/3435. So the price would be 0.23 cents

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Subject: Re: New Metal Options?
Posted by BillBedford on Mon, 18 Jun 2012 10:03:59 GMT
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The cost of metal is a very small component of the cost of silver builds, expect the costs for base-metal casting to not very much cheeper than silver.

Subject: Re: New Metal Options?
Posted by wiwa on Mon, 18 Jun 2012 13:38:27 GMT
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BillBedford wrote on Mon, 18 June 2012 10:03The cost of metal is a very small component of the cost of silver builds, expect the costs for base-metal casting to not very much cheeper than silver.
Actually, it looks like the market price for silver would be at about $9.22 per cubic centimeter right now, so they are tagging the volumetric build price very close to the price of silver, possibly taking a loss or speculating on it even.
Please check my math, i'm not being too careful - the number above should actually be 1/1465 or right around 1 cent per cc - because of the troy ounces conversion

---

Subject: Re: New Metal Options?
Posted by stop4stuff on Mon, 18 Jun 2012 16:25:03 GMT
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Whilst you're checking the maths, what's the cost of the wax print? There's so much more to factor into the cost of the printed 'metal' than just the cost of the raw metal - all of this was mentioned when Shapeways first offered Silver as a material. I don't think you'll find a better priced option for a one off silver (or any other cast metal) design than what Shapeways offer - the first item of a silver design made traditionally will cost anywhere between 5 and 15 times the cost of the same item from Shapeways. Obviously the cost does fall thereafter, however the service Shapeways offer ensures that anyone with the modelling skills can create that one off special gift item for a fraction of the cost.

Asides from the raw material cost, I envisage no difference in the initial creation cost of whatever material an item is made in, after-all, 3D printing is also known as rapid prototyping and is comparatively very cost effective.

Paul

Subject: Re: New Metal Options?
Posted by BillBedford on Mon, 18 Jun 2012 16:43:00 GMT
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wiwa wrote on Mon, 18 June 2012 13:38
Actually, it looks like the market price for silver would be at about $9.22 per cubic centimeter right now, so they are tagging the volumetric build price very close to the price of silver,

Maybe, but the $30 setup charge isn't going to change. So anyone wanting a base metal piece made is going to have to pay at least $35 to have it made. We will have to see what the size restraints are going to be, but I don't expect them to be anything to different to the silver ones.

Subject: Re: New Metal Options?
Posted by nancyliang on Mon, 18 Jun 2012 16:55:35 GMT
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A lot of the cost from DMLS comes from labor. Unlike plastic, metal requires more heat and cannot be just supported with the powder during printing, so we'll need to print sprues as part of the printing process. Now, printing sprues also means machining off sprues, which is labor (which is $$). That's unfortunately, not going to change even in Stainless Steel powder. So while, yes, we can do it.. I don't think price is going to be significantly lower if we use an alternative material to titanium (for DMLS).

For casted metals, a good chunk of it is handling and labor as well, it takes machine & labor to cast something--regardless of material. In fact, some material that cost less in silver might actually be more difficult to cast in silver.

I hope that gives you guys some insight into the various components of the price.

We will, of course, aim to keep prices reasonable--which is a big consideration when thinking about DMLS vs. Casted Metal vs. other production techniques we're looking at.

Subject: Re: New Metal Options?
Posted by stop4stuff on Mon, 18 Jun 2012 17:02:01 GMT
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Hey Nancy,

How you keeping?

Wax print then cast is a much better option than DMLS from a designer's point of view and is more cost effective (= cheaper) from my personal research.

Paul

Subject: Re: New Metal Options?
Posted by Ray716 on Mon, 18 Jun 2012 18:00:03 GMT
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While i voted for Titanium because of my love of reactive metals if you can have other fine metal options i know the jewelers on here would be THRILLED!

Fine Jewelry metal options:

Palladium, it's cheaper than Platinum, it's lighter and also a bit whiter.

Platinum, "classic" expensive metal which oddly enough is cheaper than Gold right now...

Gold, customers LOVE gold. Period. They see the value in it as the metal and for the most part are willing to pay for said value.

Since we already have silver, can we have the option to Plate that silver with gold?

Also what you might do is base the fine metal prices off of the current market value like what most jewelry stores do. I know a lot of jewelers who use the site www.kitco.com for their daily pricing.

-my 2 cents

Ray

Subject: Re: New Metal Options?
Posted by wiwa on Tue, 19 Jun 2012 05:56:56 GMT
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BillBedford wrote on Mon, 18 June 2012 16:43wiwa wrote on Mon, 18 June 2012 13:38
Actually, it looks like the market price for silver would be at about $9.22 per cubic centimeter right now, so they are tagging the volumetric build price very close to the price of silver,

Maybe, but the $30 setup charge isn't going to change. So anyone wanting a base metal piece made is going to have to pay at least $35 to have it made. We will have to see what the size restraints are going to be, but I don't expect them to be anything to different to the silver ones.

So theoretically, if you bought >25 cc of silver from Shapeways, you could melt it down and resell it at their expense

a $30 setup is still pretty good for aluminum. I have paid a lot more in setup fees for the same service. They always charge the market rate for the actual material though.

Subject: Re: New Metal Options?
Posted by stop4stuff on Tue, 19 Jun 2012 06:11:34 GMT
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The melt price of sterling silver is nowhere near the cost of Shapeways 'printed' Silver, buying a print to sell as scrap is a surefire way to lose money.

Forget about the actual cost of the raw metal, there's loads of other factors involved with Shapeways empowering people to hold their ideas in their hands.

Subject: Re: New Metal Options?
Posted by wiwa on Tue, 19 Jun 2012 06:26:00 GMT
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stop4stuff wrote on Tue, 19 June 2012 06:11The melt price of sterling silver is nowhere near the cost of Shapeways 'printed' Silver, buying a print to sell as scrap is a surefire way to lose money.

Forget about the actual cost of the raw metal, there's loads of other factors involved with Shapeways empowering people to hold their ideas in their hands.
You're right for the most part, but they do say it's 92.5% pure silver, so they really are charging below market rate for it...

I'm just thinking that a much cheaper option would open a lot more doors for ideas. They could charge 50x price of aluminum, the same setup fee as silver, and you would be able to make a fist sized aluminum object for $50. That would be $100's+ in silver

---

Subject: Re: New Metal Options?
Posted by stop4stuff on Tue, 19 Jun 2012 06:46:39 GMT
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wiwa wrote on Tue, 19 June 2012 06:26
You're right for the most part, but they do say it's 92.5% pure silver, so they really are charging below market rate for it...

92.5% Silver is called Sterling Silver - I'm not sure how you calculate the prices, but according to my maths, to buy 1cc of certified sterling silver is around $9.50 + taxes, Shapeways are charging $20 + taxes for 1cc non-certified Silver. And don't forget the sale value of non-certified Sterling Silver is way less. In reality this is like comparing a Ferrari to a Lamborghini - they're both makes of car but different kinds.

wiwa wrote on Tue, 19 June 2012 06:26
I'm just thinking that a much cheaper option would open a lot more doors for ideas. They could charge 50x price of aluminum, the same setup fee as silver, and you would be able to make a fist sized aluminum object for $50. That would be $100's+ in silver

Yes that's about right, and please remember that all of this was mentioned when Shapeways first offered Silver as a material, have a search through the forums - no point going over it all again

---

Subject: Re: New Metal Options?
Posted by wiwa on Tue, 19 Jun 2012 06:56:17 GMT
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stop4stuff wrote on Tue, 19 June 2012 06:46
92.5% Silver is called Sterling Silver - I'm not sure how you calculate the prices, but according to my maths, to buy 1cc of certified sterling silver is around $9.50 + taxes, Shapeways are charging $20 + taxes for 1cc non-certified Silver. And don't forget the sale value of non-certified Sterling Silver is way less. In reality this is like comparing a Ferrari to a Lamborghini - they're both makes of car but different kinds.

So, for each cc from shapeways you are paying $1.50 less than you would otherwise. So once you get 20cc that covers the setup charge. Then a few more covers shipping and taxes. I'm not saying it would be profitable - it's just tickling my funny bone to think of 3D printing silver bullion.

Quote:
Yes that's about right, and please remember that all of this was mentioned when Shapeways first offered Silver as a material, have a search through the forums - no point going over it all again

They did just release this poll, so I'm assuming it's up in the air again. i'm hopeful for it!

Subject: Re: New Metal Options?
Posted by stop4stuff on Tue, 19 Jun 2012 07:08:56 GMT
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Certified Sterling Silver = $9.50 per cc
Shapeways non-certified Sterling Silver = $20 per cc

The difference is $10.50 in Shapeways favour.

But if you read that as different, go ahead, it's your money.

Subject: Re: New Metal Options?
Posted by wiwa on Tue, 19 Jun 2012 07:14:03 GMT
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stop4stuff wrote on Tue, 19 June 2012 07:08Certified Sterling Silver = $9.50 per cc
Shapeways non-certified Sterling Silver = $20 per cc

The difference is $10.50 in Shapeways favour.

But if you read that as different, go ahead, it's your money.

Oh, silly me, I was looking at the $8 price for stainless. The colors threw me off. Thanks for catching me before I tried to curb the silver market!

Subject: Re: New Metal Options?
Posted by stop4stuff on Tue, 19 Jun 2012 12:28:11 GMT
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It is said a picture speaks a thousand words, but sometimes it is worth reading the words too

---

Subject: Re: New Metal Options?
Posted by wiwa on Tue, 19 Jun 2012 17:32:20 GMT
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stop4stuff wrote on Tue, 19 June 2012 12:28
It is said a picture speaks a thousand words, but sometimes it is worth reading the words too

I've got a slight massive case of pictorial-numeric dyslexia I guess

---

Subject: Re: New Metal Options?
Posted by Silverbeam on Wed, 20 Jun 2012 17:33:51 GMT
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whatever is cheapest...

would aluminum be cheaper than the stainless steel?

Subject: Re: New Metal Options?
Posted by cadalu on Wed, 20 Jun 2012 18:02:27 GMT
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@nancyliang - Just curious, what kind of general time frame is SW looking at for adding new

metals?

Subject: Re: New Metal Options?
Posted by nancyliang on Wed, 20 Jun 2012 19:01:10 GMT
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I don't have a timeline set yet for this. Right now there are a lot of material improvements/new materials we could do, and I am getting a sense of what you guys would like to have.