2000x Microscope

Posted by wickededge - 30 Jun 2012 08:28

The new scope came in Wednesday and I'd hoped to kick off this category with some great hi-res pics, but then was out sick on Thursday and wrapped up in meetings on Friday so I didn't get a really good chance to play with it. I also still need to get a NIST traceable micro-ruler to calibrate it. If anyone knows of one for under $1200, I'd love to hear about it. Even without calibration though, I should be able to start posting some of the pics. At first glance, it looks pretty exciting. I can see the tiniest of scratches from our micro-abrasives really clearly, so with some luck and work, we should be able to learn a whole lot about all the stones and strops.

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Re: 2000x Microscope

Posted by wickededge - 29 Sep 2012 08:10

Hey Ken,

My interest in the higher magnifications is to better understand what is happening with super fine polishing grits and substrates e.g. cow leather vs kangaroo vs horse vs nano-cloth etc... The studies I've already done have told me a lot, but I want to keep learning. I also want to be able to view and measure the edge end-on after it's been sharpened with various media.

KenBuzbee wrote:

wickededge wrote:

Once of these days, I'll have to scheme regular access to and SEM

While that would be interesting, I think you may get beyond what you're trying to "see" (from a practical stand point) Looking at the surface of polished steel where the grain structure looks like the surface of the moon may not actually be helpful in terms of sharpness. It would be interesting to figure out how much is enough, though.

For me, I find other elements like focus and depth of field to be more important than magnification.

Ken

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Re: 2000x Microscope
Posted by KenBuzbee - 29 Sep 2012 08:21

Understood Clay, and I think that's a great thing. Just pointing out there may be (I don't really know) a point where more magnification isn't more helpful.

But you'll figure it out if true.

Ken

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Re: 2000x Microscope
Posted by cbwx34 - 29 Sep 2012 10:07

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wickededge wrote:

First image at 2000x and only a few seconds in which to post it:

I was going to say you're just a big tease... but in this case, I guess you're a **little** one!

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Re: 2000x Microscope
Posted by AnthonyYan - 29 Sep 2012 11:23

Hi Clay,

Have you considered a contact profilometer at all? It's a device used to measure surface-roughness, and is typically used in some metal-working and/or machine-shops. It runs a tiny stylus over the surface and reports back a numerical measurement. The "advantage" is that while it is very expensive (thousands of dollars), it is not insanely expensive (like an scanning electron microscope). The downside is that it returns numbers, not an image. Or, I suppose, it may return a single line of data as a graph (ie: a 2d plot where x-axis is horizontal position of the stylus and y-axis is the stylus height). So it's not as simple to interpret the results. And if the surface is directional (like lots of parallel scratches), then the scanning direction will affect the results.

There are non-contact profilometers; they're typically based on light scanning. But non-contact profilometers are insanely expensive (at least from what little I've heard).

I know almost nothing about profilometers, except what I've read on wikipedia:

en.wikipedia.org/wiki/Profilometer

en.wikipedia.org/wiki/Surface_metrology

Example of a contact profilometer by Mitutoyo (high quality Japanese company):

www.amazon.com/Mitutoyo-178-561-02A-Surf...=pd_sim_sbs_indust_1

Probably not worth buying. But if you have any friends who work in a lab for manufacturing, machining, or metrology, it might be worth asking them for a favor?

I kind of got curious about metrology in general, and got sucked into browsing Wikipedia for hours and hours.

Sincerely,

--Lagrangian

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Re: 2000x Microscope

Posted by wickededge - 29 Sep 2012 16:53

This is fascinating. I'd never even heard of a contact profilometer before. It might be what CoorsTek uses for their stones since they measure in RA (roughness average). I'll definitely check them out. Thanks for the tip!

AnthonyYan wrote:

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Re: 2000x Microscope

Posted by wickededge - 01 Oct 2012 13:29

While not pretty to look at at 2000x, here is another image of a blade that I polished mostly smooth and

then used the fine side of the Micro-Fine ceramics to lay in a a scratch pattern:

The fine scratches going from lower left to upper right are left over from the kangaroo strops with .5um diamond spray. The couple of big scratches coming from lower right to upper left are from the Micro-Fine stones. I took 4 measurements: .57um, .64um, .68um and .72um. I calibrated my scope and the lens with a NIST traceable stage micrometer so I feel confident about the accuracy of the measurements inasmuch as I could find the correct edges of the scratches to measure. As can be seen in the photo below, those edges can be tricky to choose and can affect the measurement by +/- .05um:

I really wanted to verify the grit of these stones since I've had questions since they came in. I'm happy to report that they look spot on to my amateur eyes.

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