

Pivot Polishing – Why, How, & Comparing Methods

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One can know a man from his laugh, and if you like a man's laugh before you know anything of him, you may confidently say that he is a good man.

[Fyodor Dostoevsky](#)

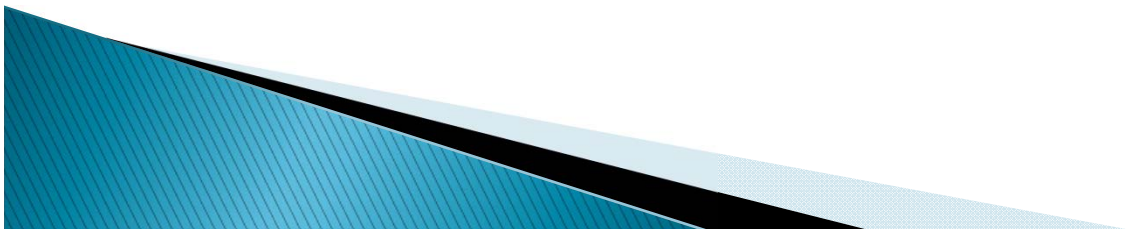
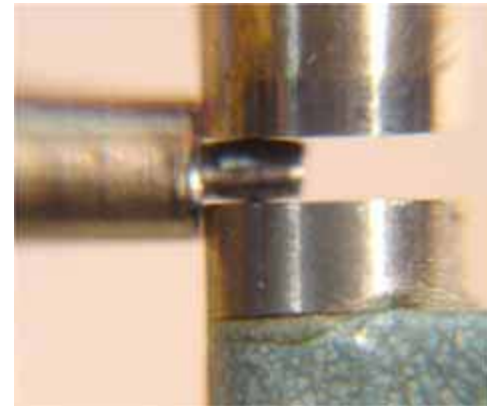
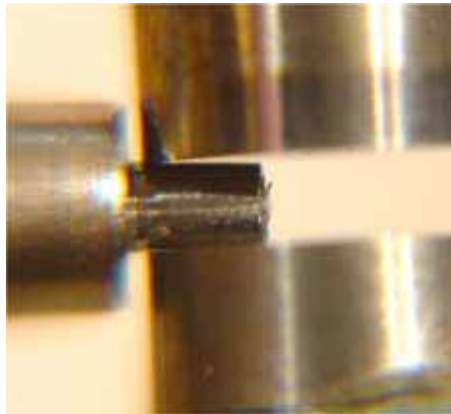
Why polish pivots?

- ▶ Reduces friction in the bearing surfaces of the clock or watch.
- ▶ Okay, but does it really need to be done?
- ▶ Benefits of pivot polishing:
 - Not polishing pivots may keep your clock or watch from running.
 - It is in keeping with the historical restoration of the timepiece & will prolong its life.
 - Well worth the extra time if you have the plates separated anyway.
 - Possibly reduces “call backs” from an angry customer.



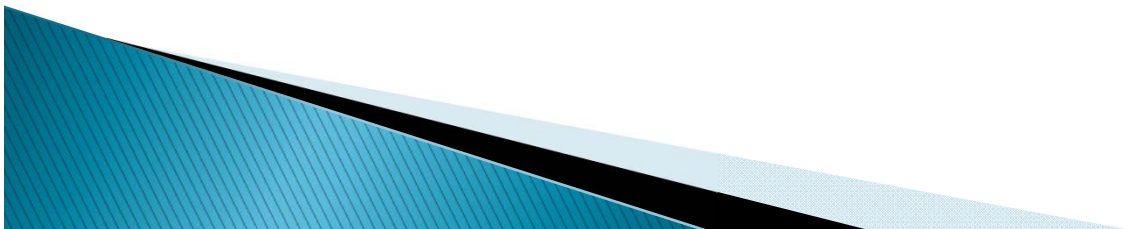
Misshapen pivots...

- ▶ How do pivots get damaged?
 - Inadequate oiling and cleaning
 - Oil & dirt forms abrasive paste over time
 - Bent pivots from broken mainspring or previous improper repairs
 - Poor polishing or burnishing technique
- ▶ Examine pivots using a micrometer or caliper jaws.



General steps for polishing pivots

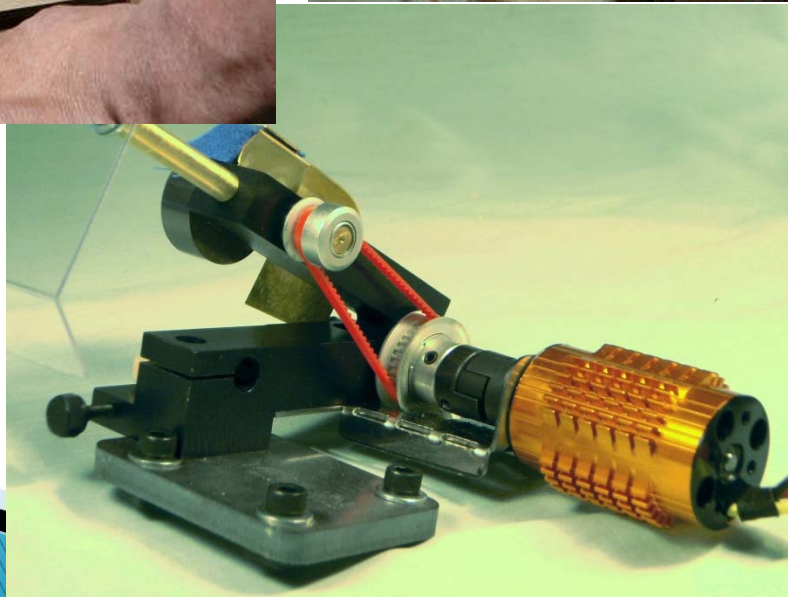
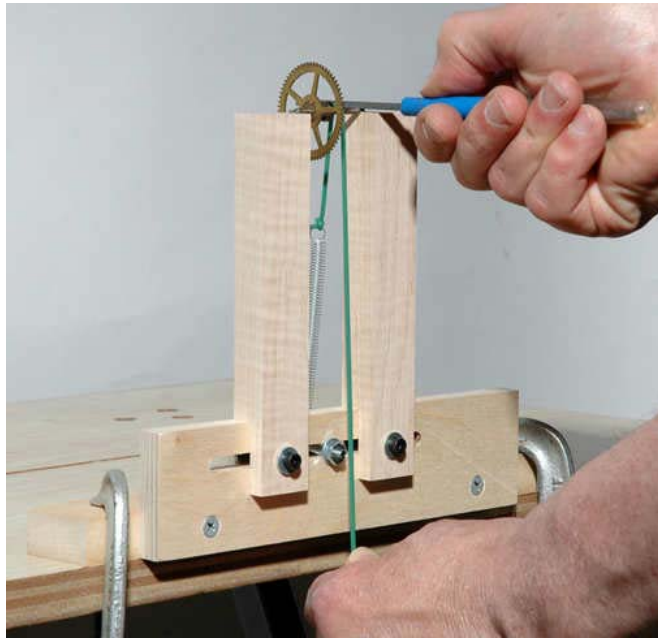
- ▶ Polish pivots after cleaning and before beginning any bushing work.
- ▶ Carefully straighten any bent arbor or pivot.
- ▶ Correct any scratches or misshapen pivots with a pivot file.
- ▶ Polish and/or burnish the pivot.
- ▶ Variety of techniques:
 - Polishing sticks & various grits of fine sandpaper
 - Stoning
 - Pivot file & burnisher
- ▶ Clean the pivots and gears again before movement reassembly



A closer look at media & tools



Pivot Polishing Machines



Pivot file and burnisher

- ▶ Available from most clock tool suppliers
- ▶ Very fine cut file
- ▶ Burnishers come in a “right hand” or “left hand” configuration
- ▶ Must be prepped before use and periodically “refreshed”
- ▶ Burnisher must be used with an oil
- ▶ Requires a little practice to become proficient

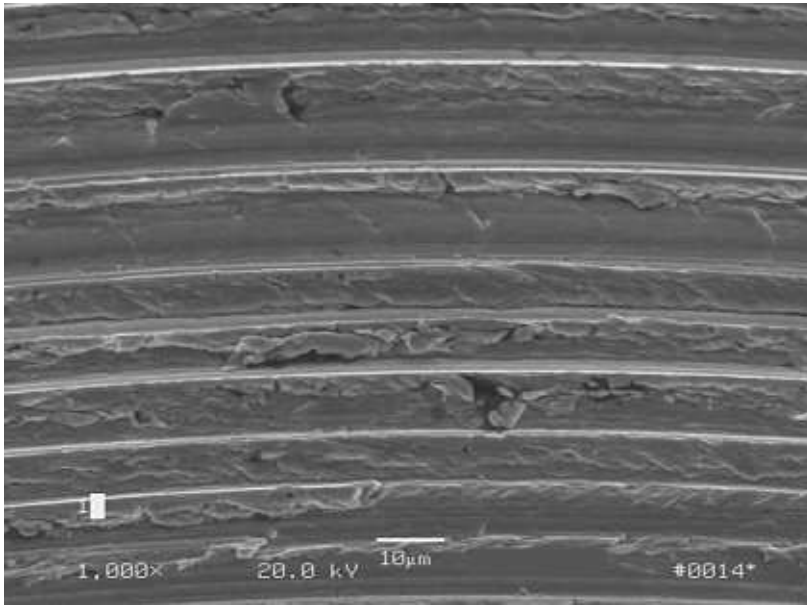
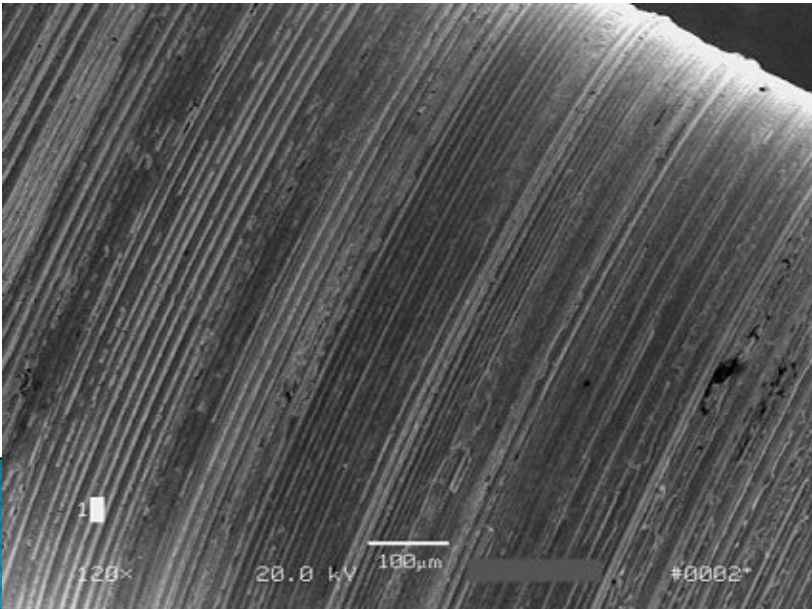
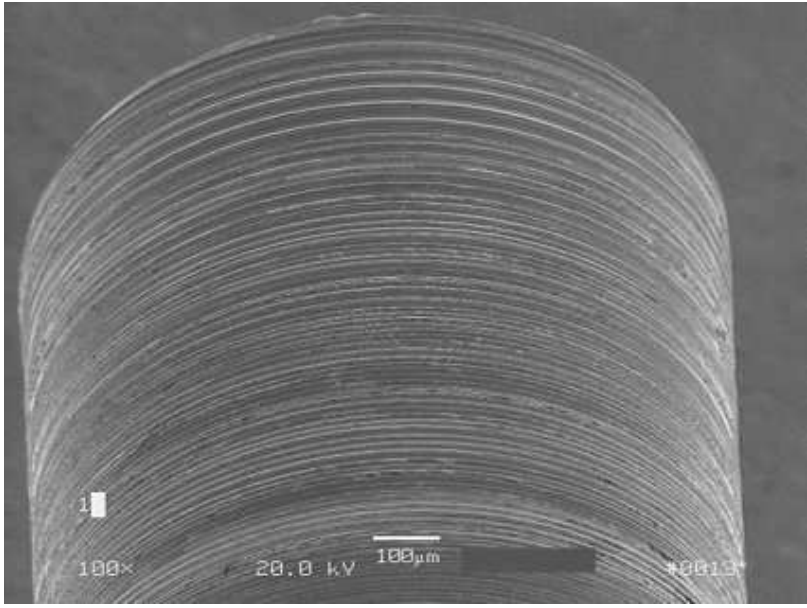
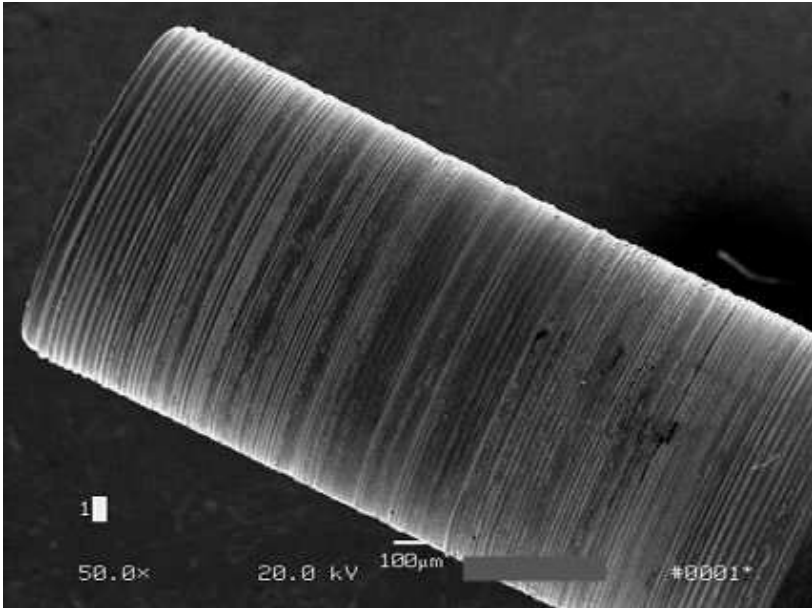


A comparison of methods

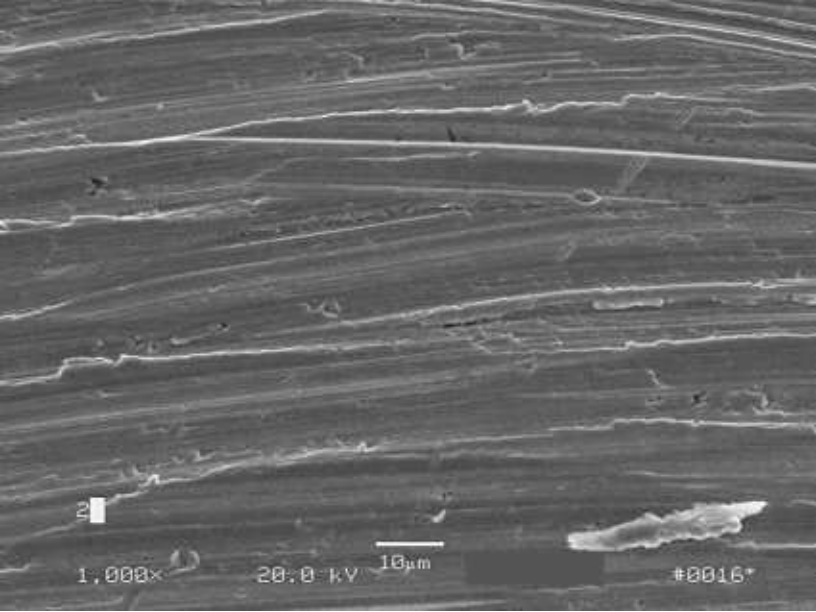
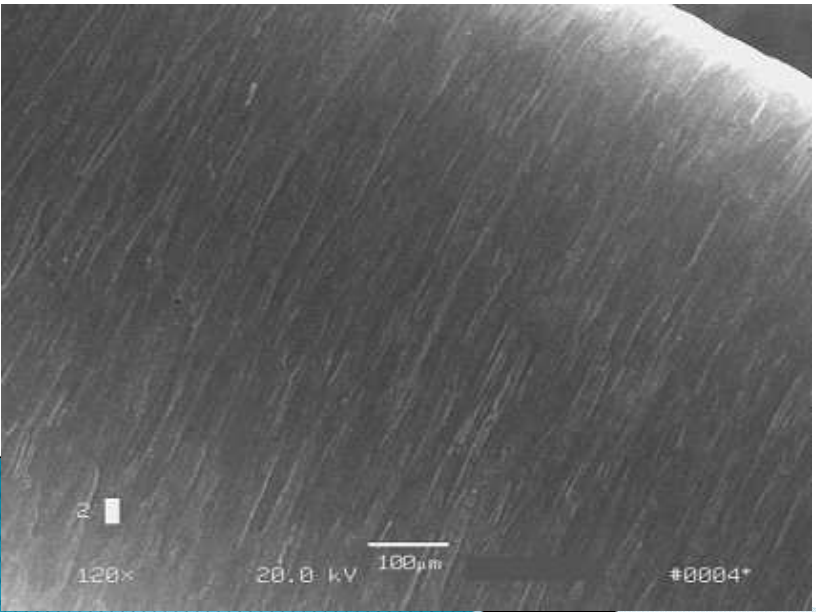
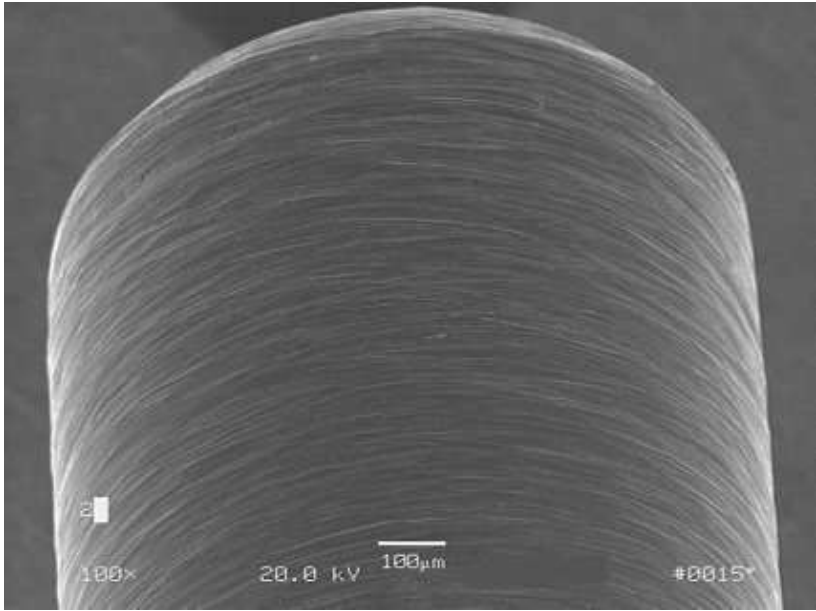
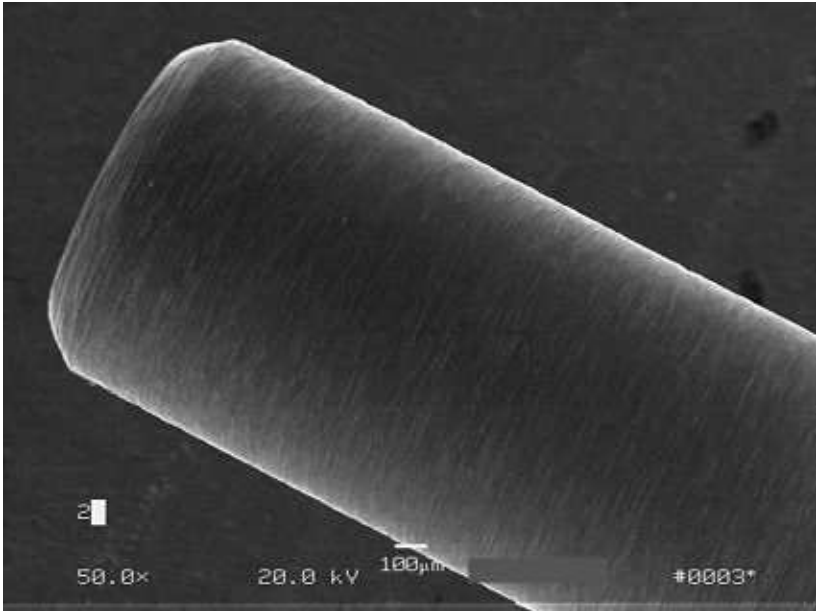
- ▶ The 2005 Bob Whiteman Analysis
- ▶ Six samples:
 - Sample 1 – as turned
 - Sample 2 – file w/#6 cut Grobet needle file
 - Sample 3 – file as #2, polished w/Cratex extra fine abrasive stick
 - Sample 4 – file as #2, polished w/320 grit silicon carbide wet/dry sandpaper with oil
 - Sample 5 – file as #2, polished w/ 320 grit and then 1000 grit silicon carbide wet/dry sandpaper with oil
 - Sample 6 – file as #2, burnished with oil



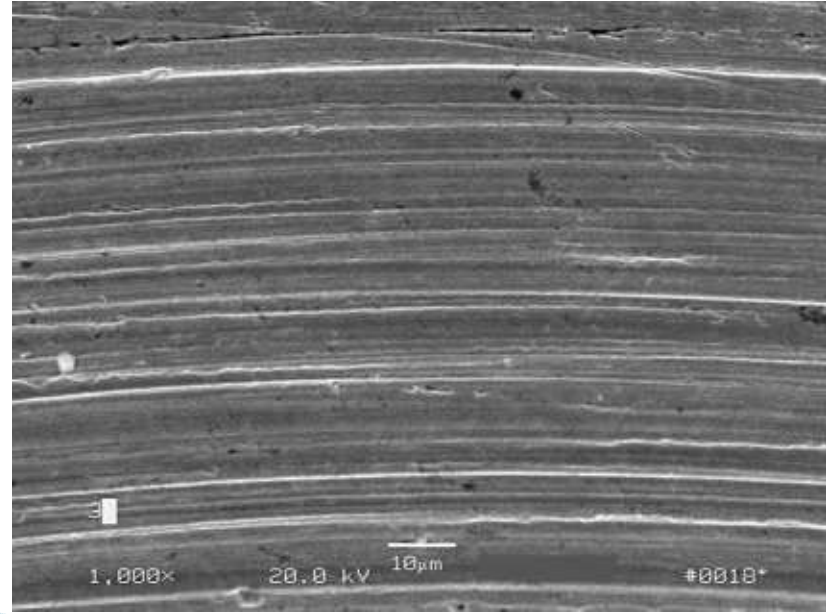
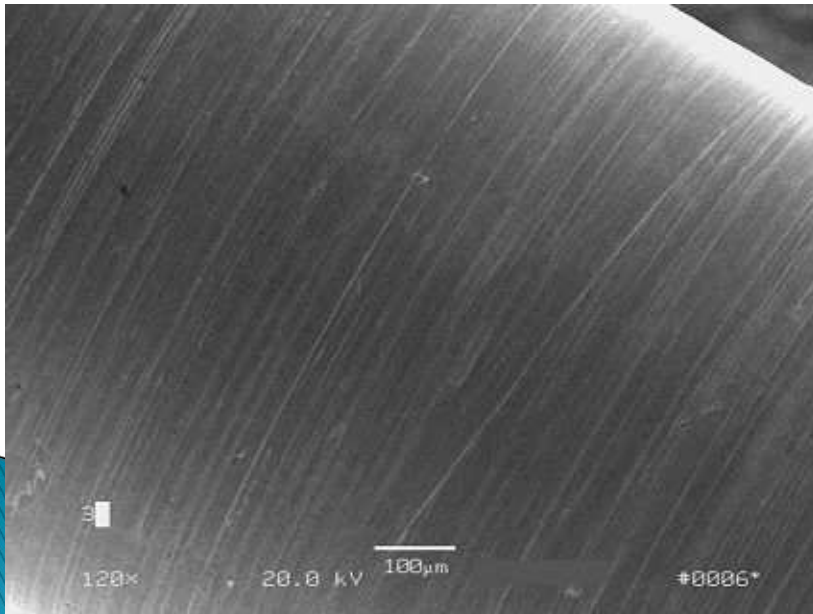
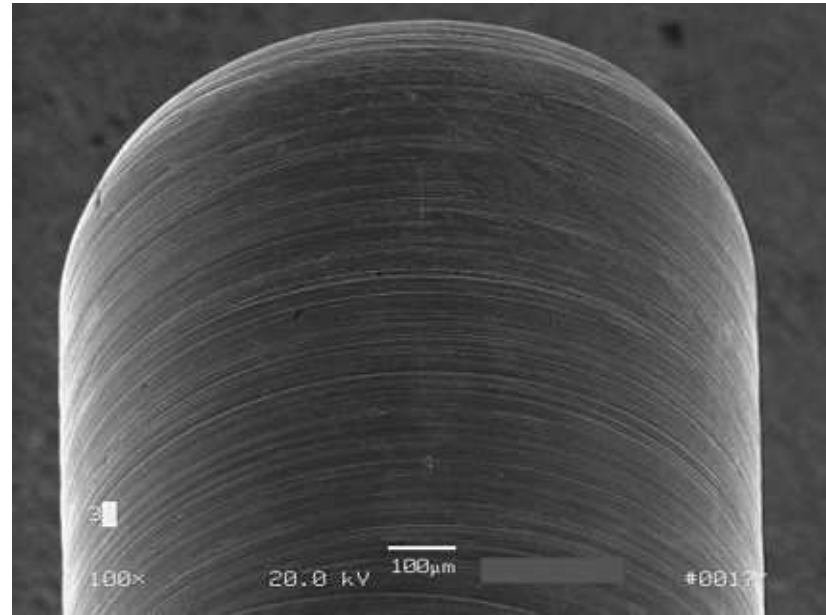
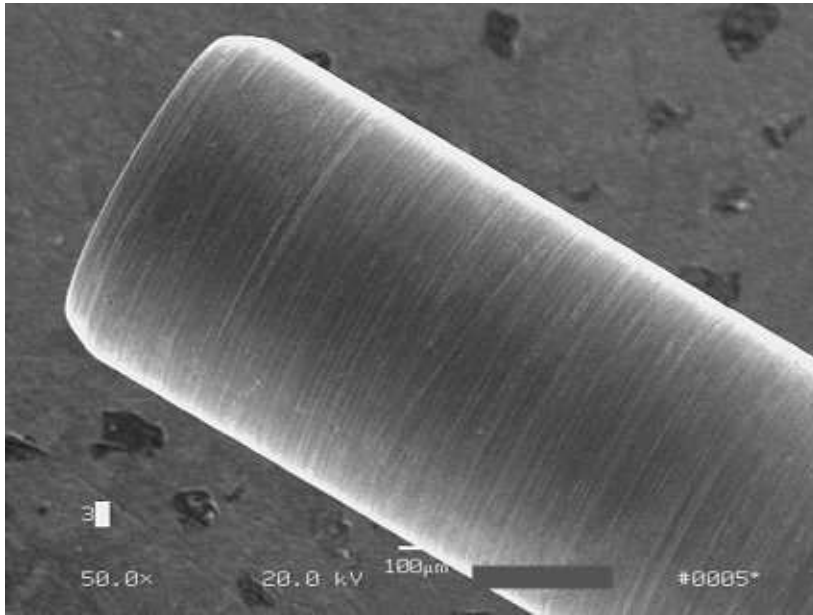
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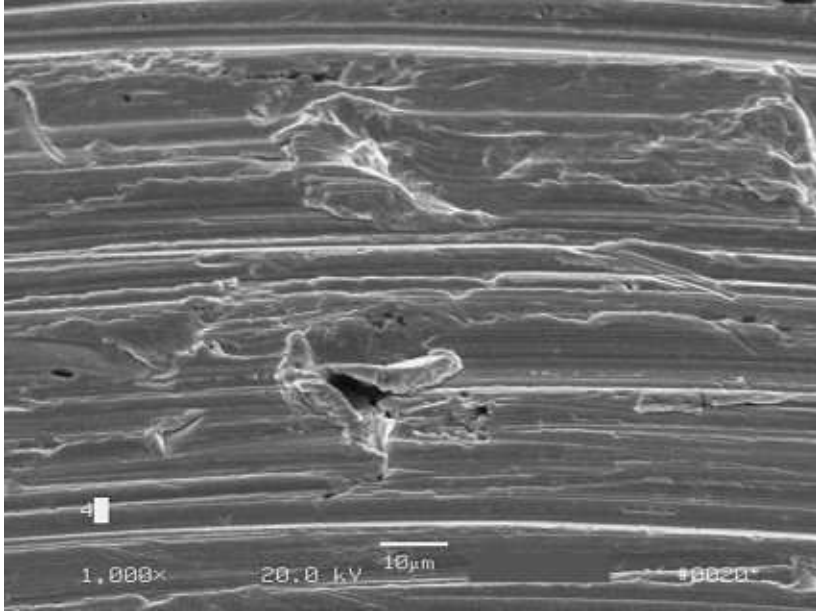
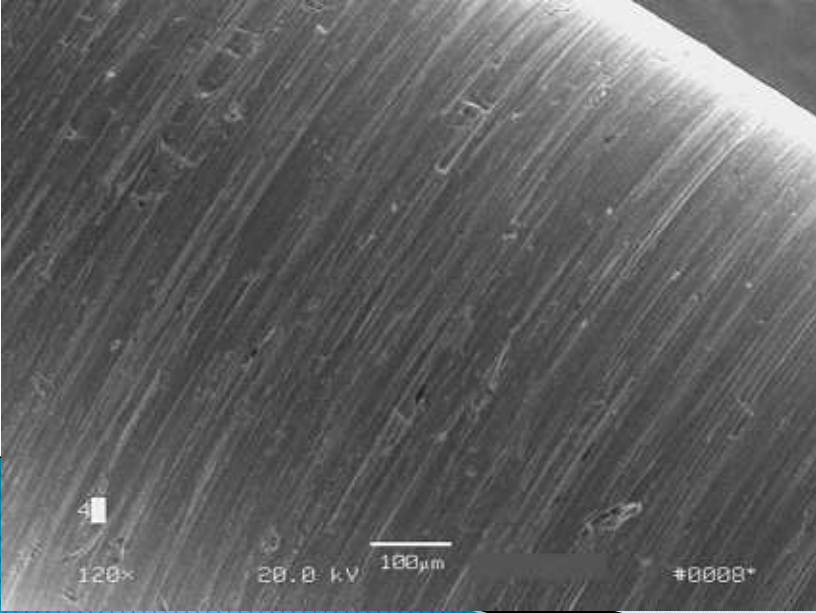
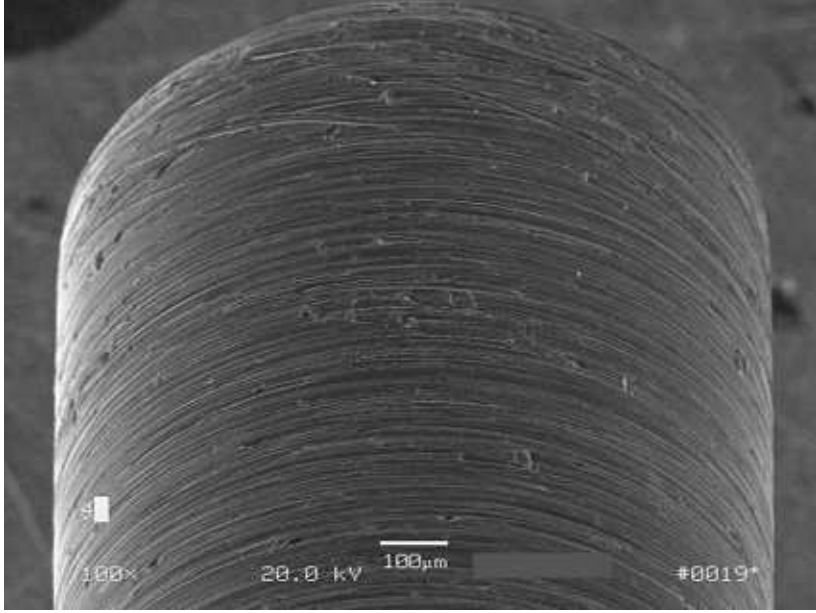
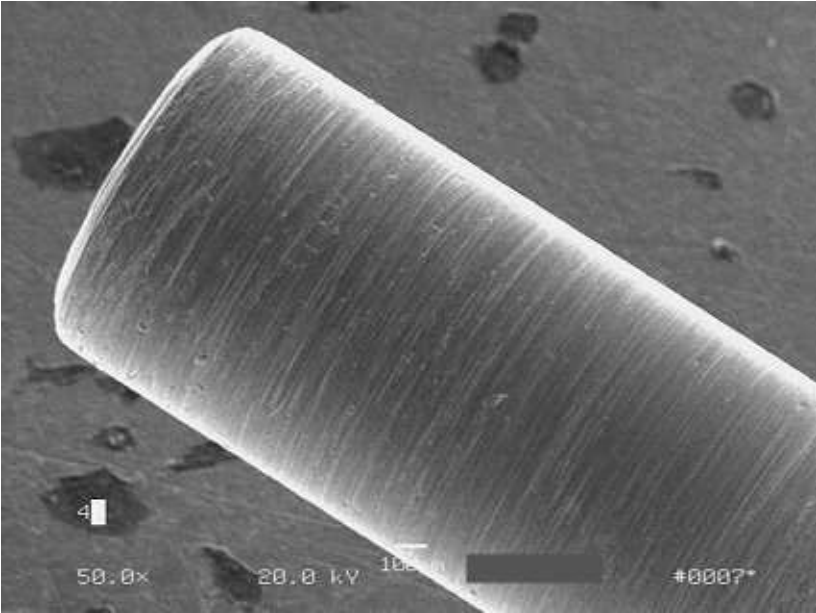
Sample 2



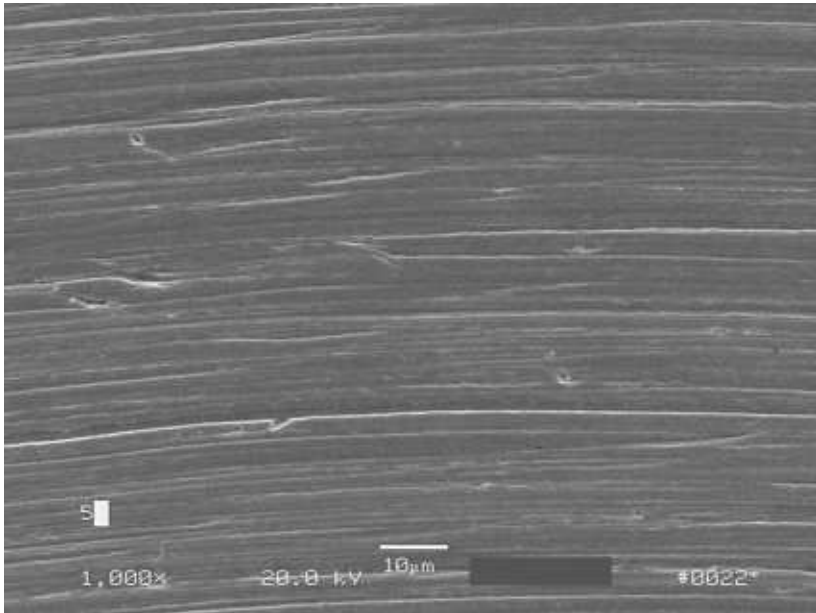
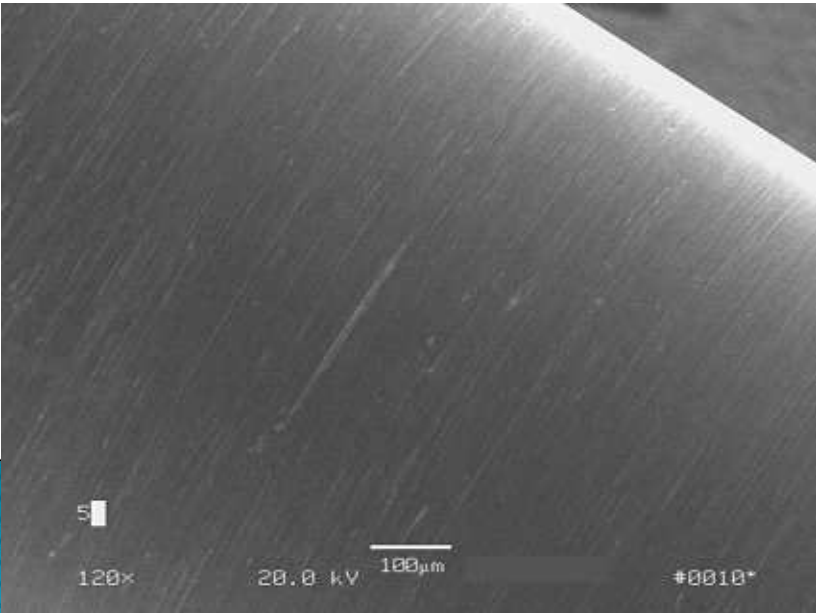
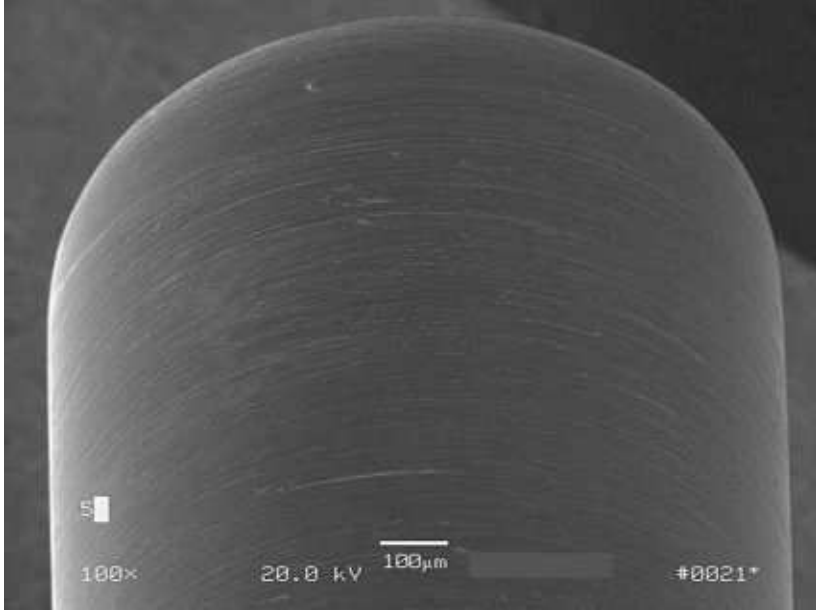
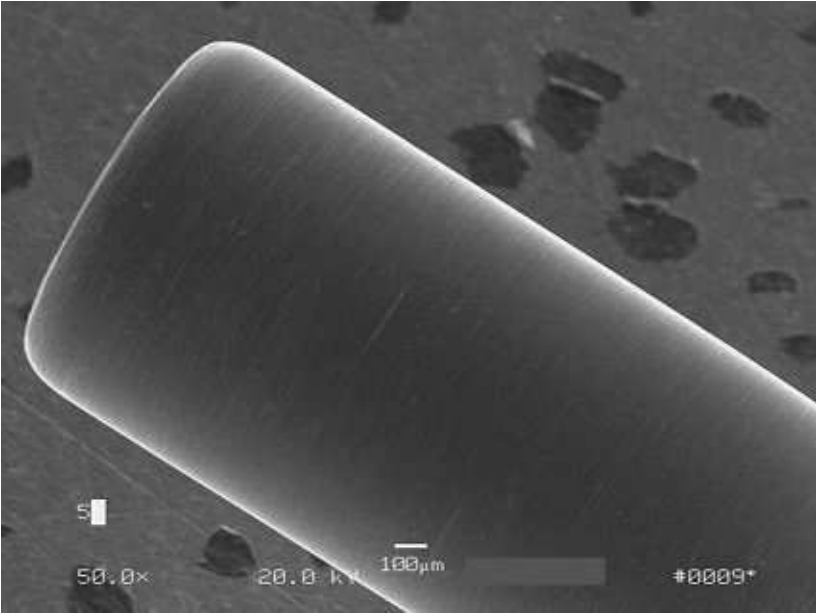
Sample 3



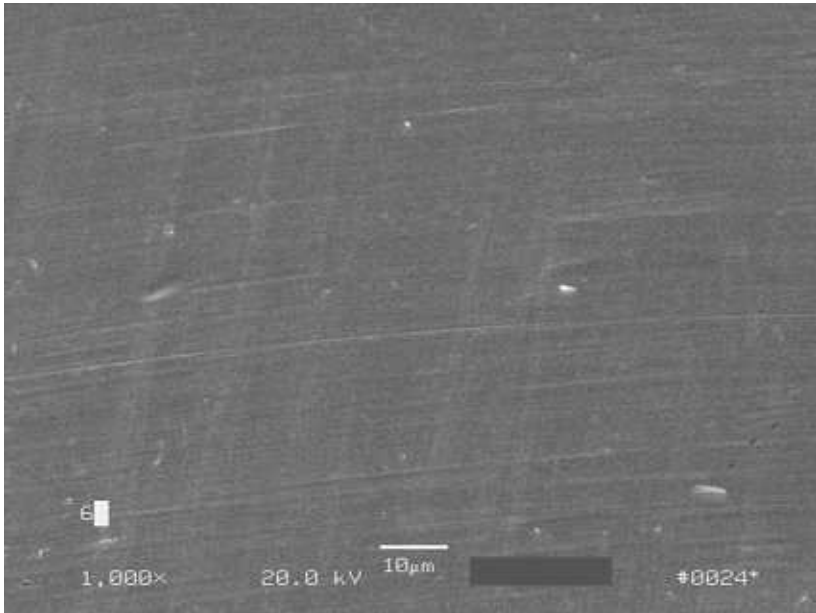
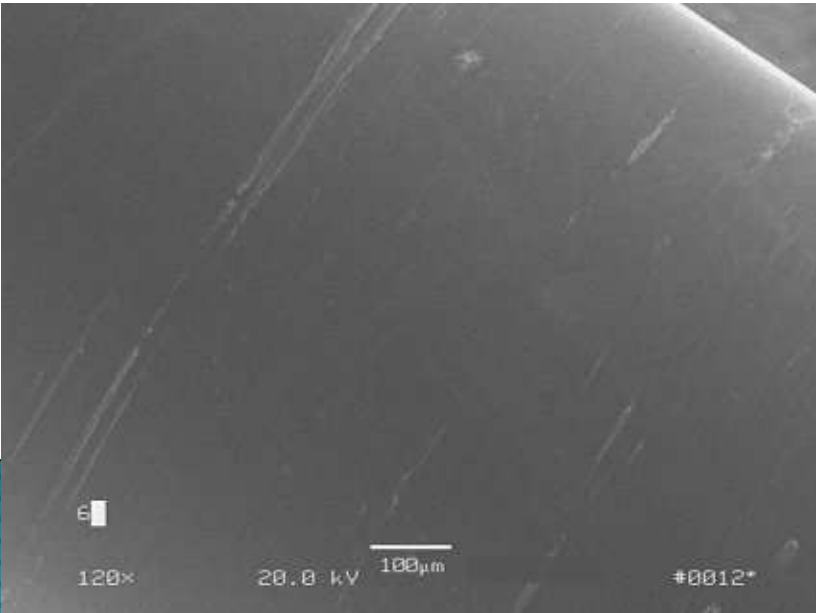
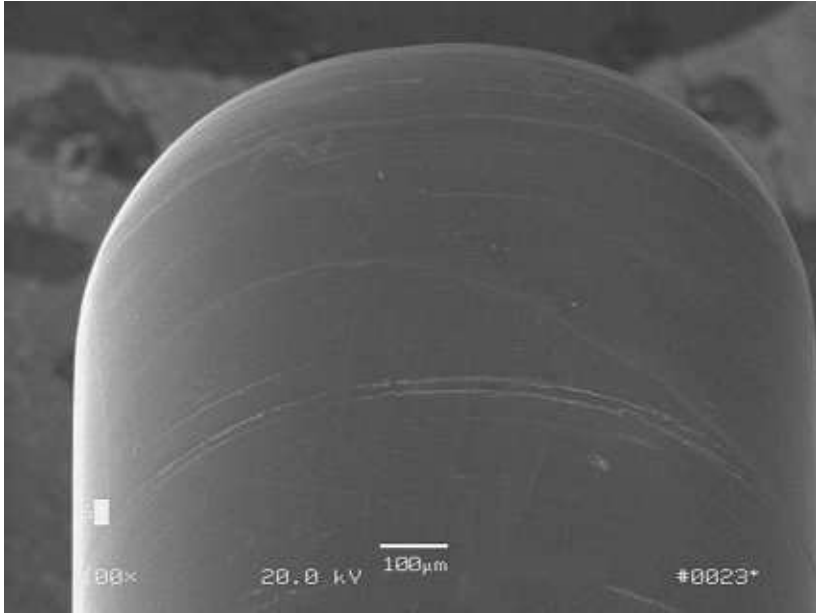
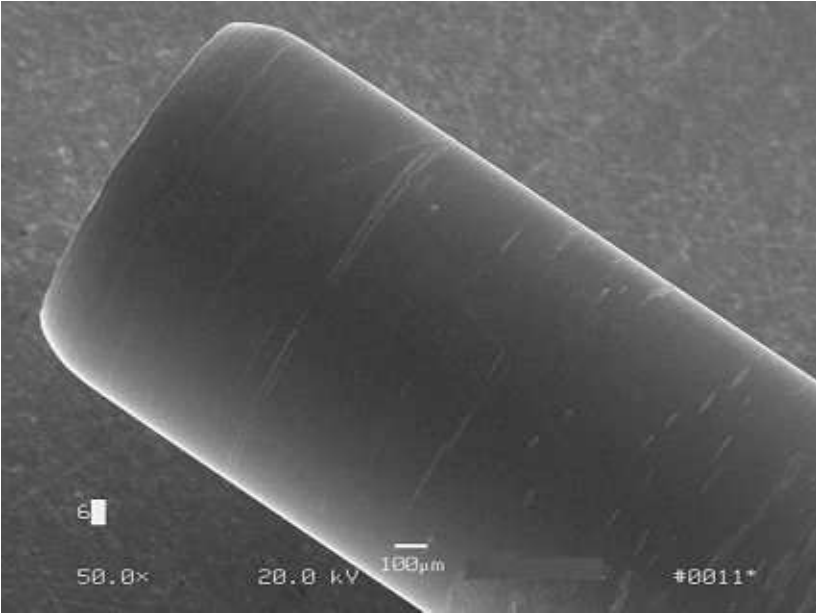
Sample 4



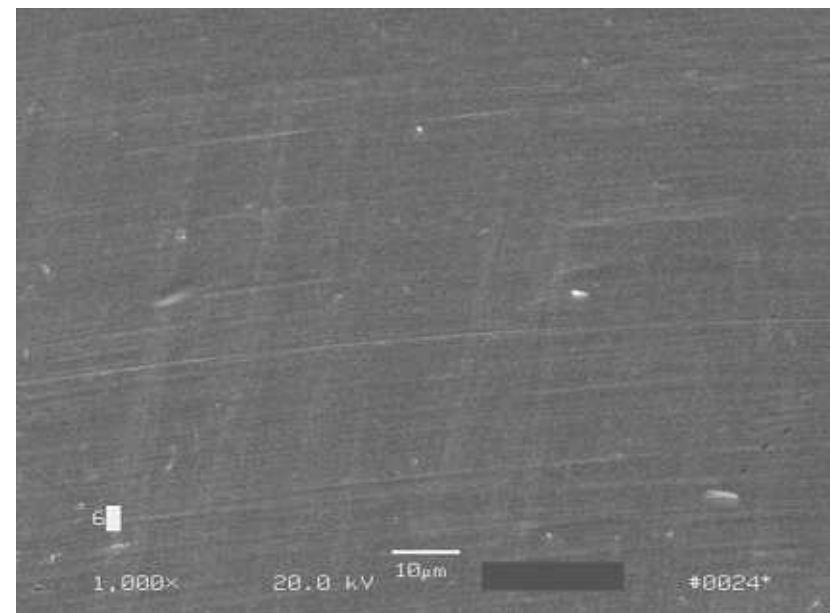
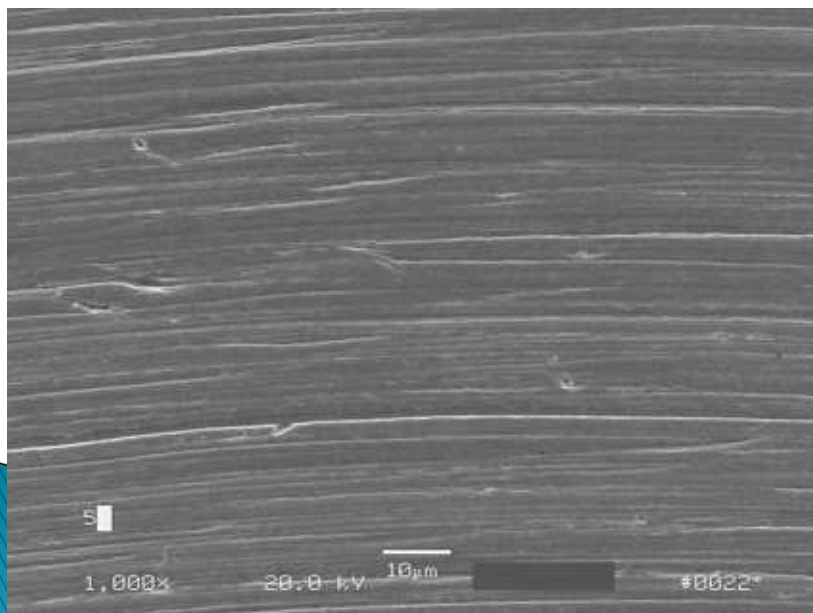
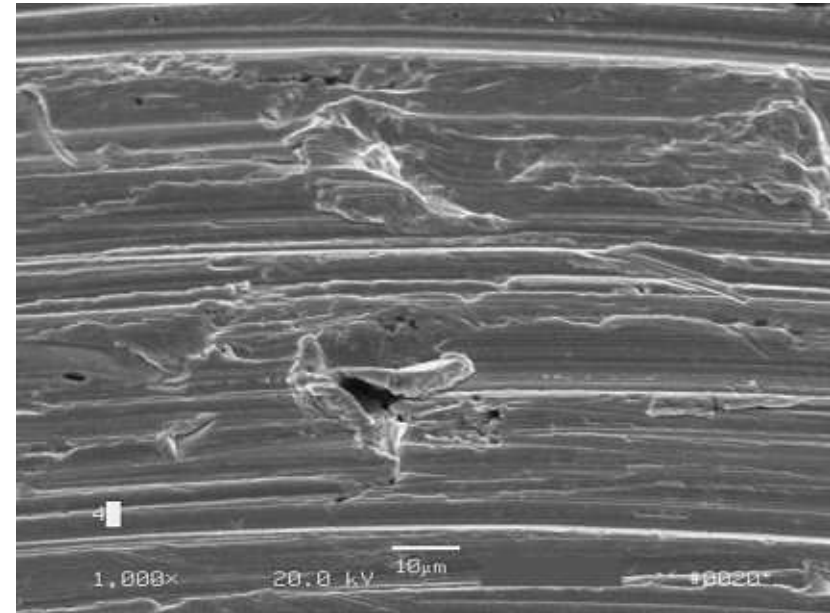
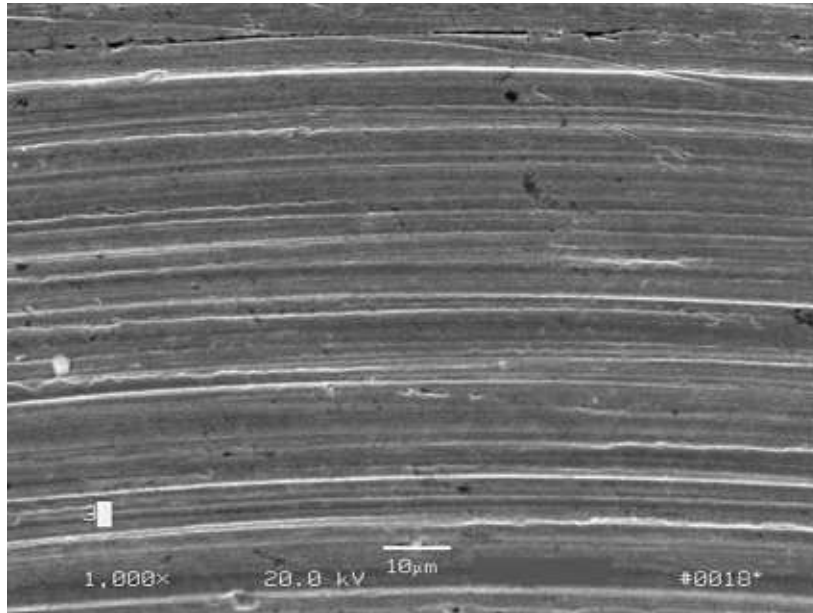
Sample 5



Sample 6



Samples 3-6 High Magnification



The 2008 Rematch

Scottie McElroy

▶ Process:

- 1500 grit supported by steel rule, dry
- 2500 grit supported by steel rule, dry
- Simichrome polish by cotton cloth backed by steel rule
- Total time 3 minutes

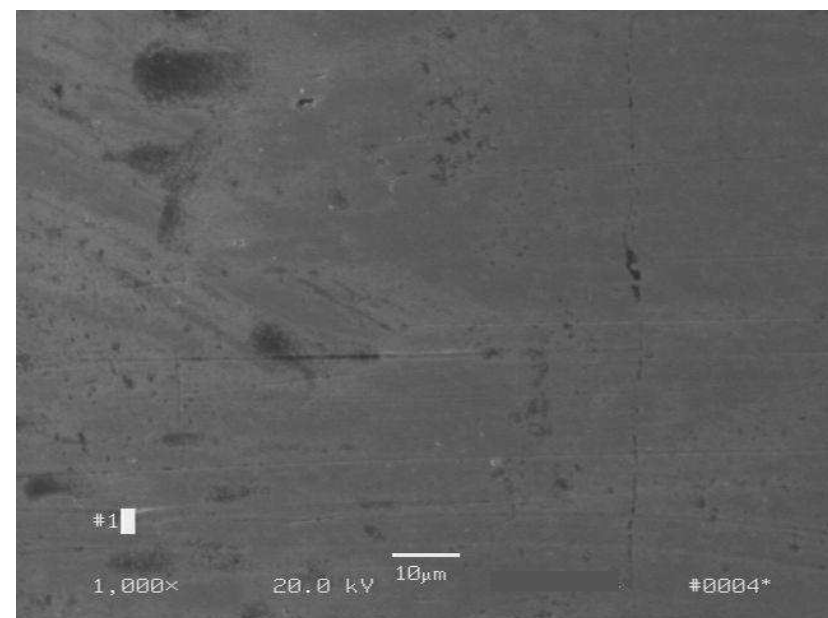
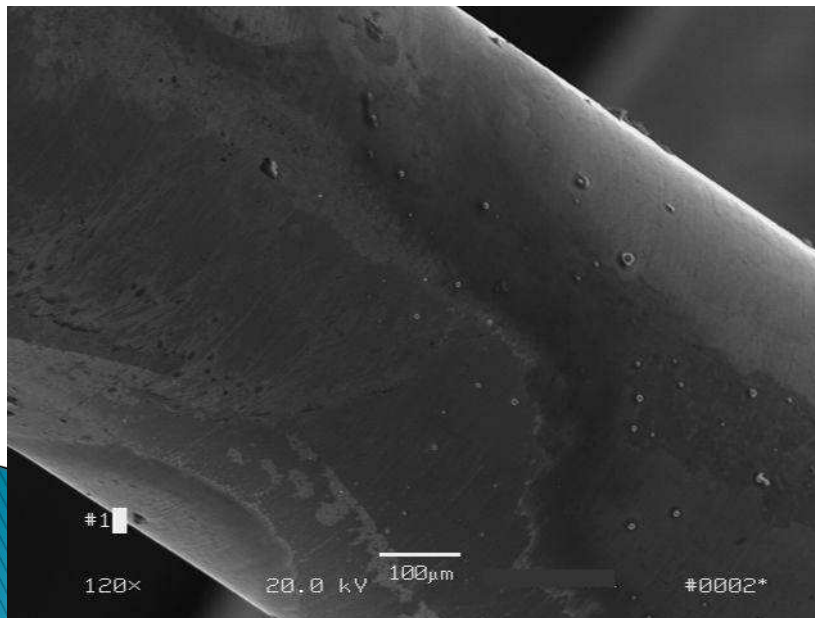
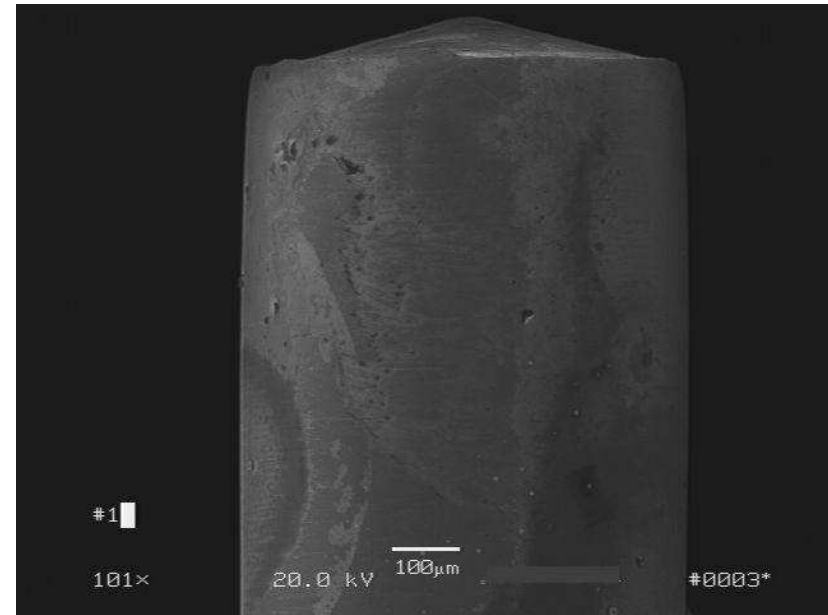
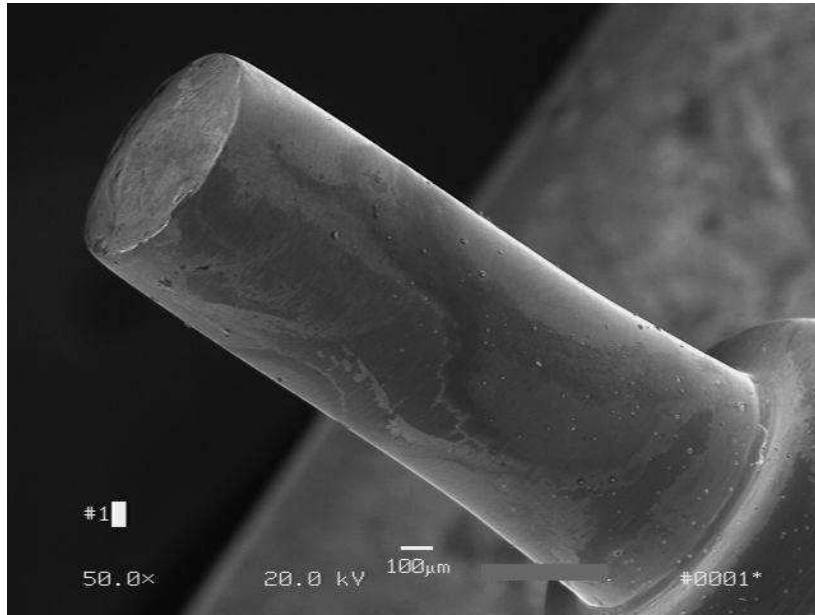
David LaBounty

▶ Process:

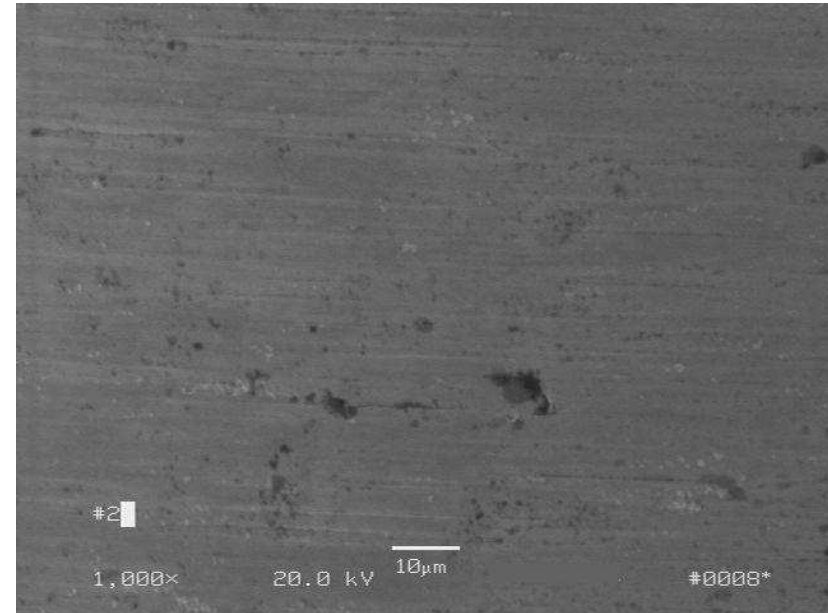
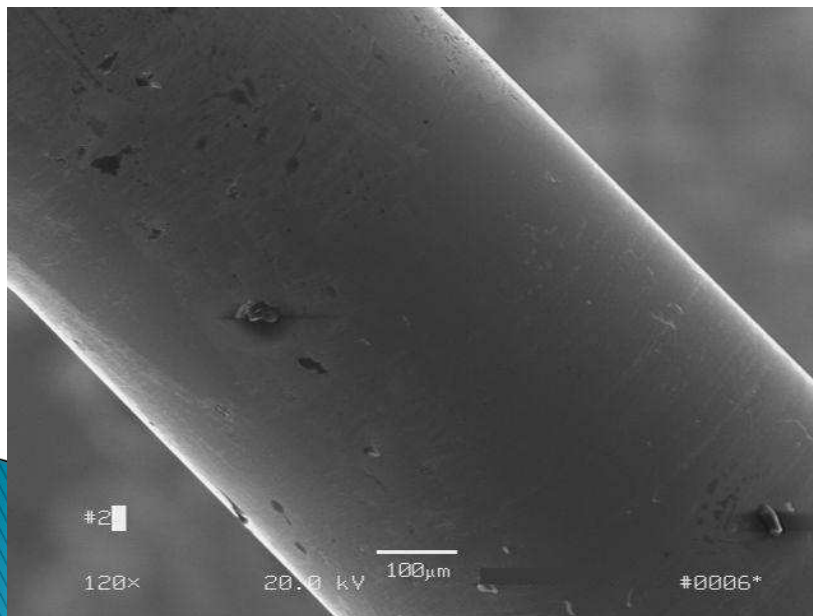
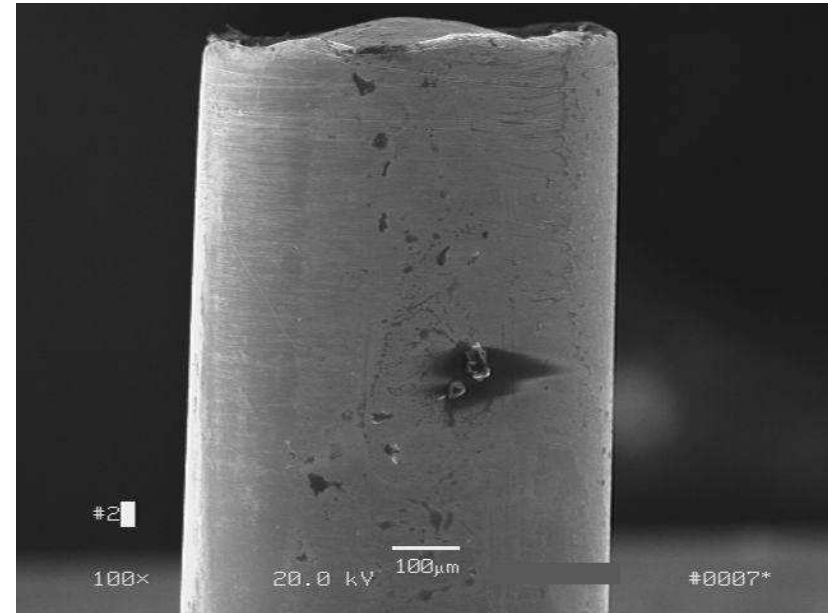
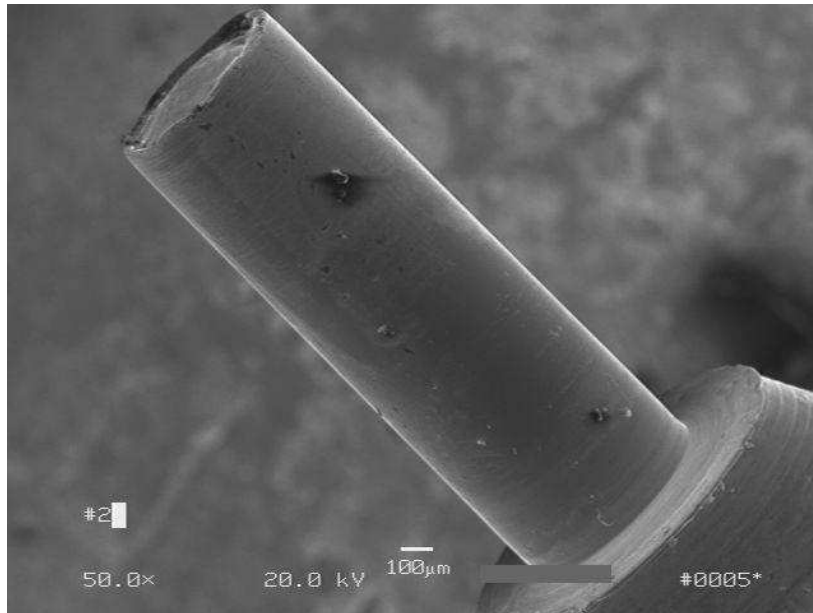
- Coarse pivot file
- Fine pivot file
- High speed steel burnisher with No. 9 Hoppe's lubricating oil
- Total time 49 seconds



Scottie McElroy Results



David LaBounty Results



My opinion of Key Points

- ▶ Any fine grade of polishing or burnishing is better than doing nothing at all.
- ▶ Polishing:
 - Disadvantages – not as good as burnishing, slower?
 - Advantage – not as easy to misshape pivot
- ▶ Burnishing:
 - Disadvantage – need to practice & develop technique, can easily misshape pivot
 - Advantages – produces the best quality pivot, hardens the pivot, faster?
- ▶ May be worthwhile to conduct a scientific study



A quick clarification...

- ▶ Burnishing and polishing are a bit different. In addition to polishing a pivot, burnishing will harden the surface of the pivot making it a better bearing surface. Polishing media alone does not harden the surface of the pivot.
- ▶ Polishing is removing material.
- ▶ Burnishing is removing a small amount of material and moving and stretching the metal.

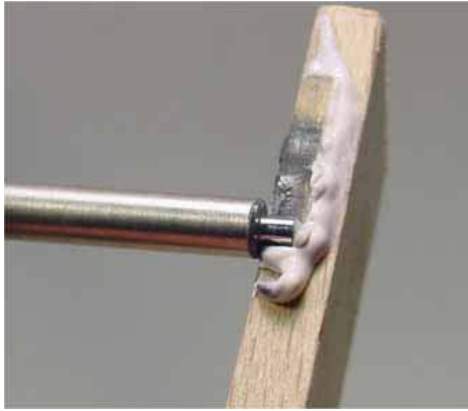


Pivot polishing tips

- ▶ Use a media and technique that best suits you.
- ▶ Use a micrometer or caliper to find misshapen pivots.
- ▶ Plated pivots on some modern German clocks cannot be filed or burnished. Use polishing compound on plain wood.
- ▶ Use a steady rest to support the arbor when using a lathe.
- ▶ Make runners to support the pivot in a lathe.
- ▶ Secure the arbor, not the pivot, in a lathe. Use a “lathe dog” when necessary.
- ▶ Highly recommend using a lathe tool post to insure your pivot and burnisher are aligned with the pivot.
- ▶ Look for debris on the pivot file or burnisher during operations.
- ▶ “Bottom” technique allows you to watch the pivot and provides better control of pressure on the pivot.
- ▶ Clean the pivots completely after polishing and after burnishing.



Examples of polishing tips tools



Questions or comments?



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