Electroforming of metallic and nano composite micro structures

Researcher: Xueyong Wei **Supervisor:** Kyle Jiang

PROJECT DESCRIPTION:

When the electroforming as an old technology meets the cutting edge micro and nano technology, new opportunities are born to fabricate high precision components at lost cost and high throughput. In this project, the researchers developed micro/nano electroforming process based on UV-Lithography and Nanosphere Lithography. Nickel based micro components and nano patterns were successfully fabricated and characterized. Nanoparticles like alumina and carbon nanotubes were used to enhance mechanical properties of electroformed nickel structures.

Figure 1 Electroformed Nickel Millimetre Wave Microcomponent [1].

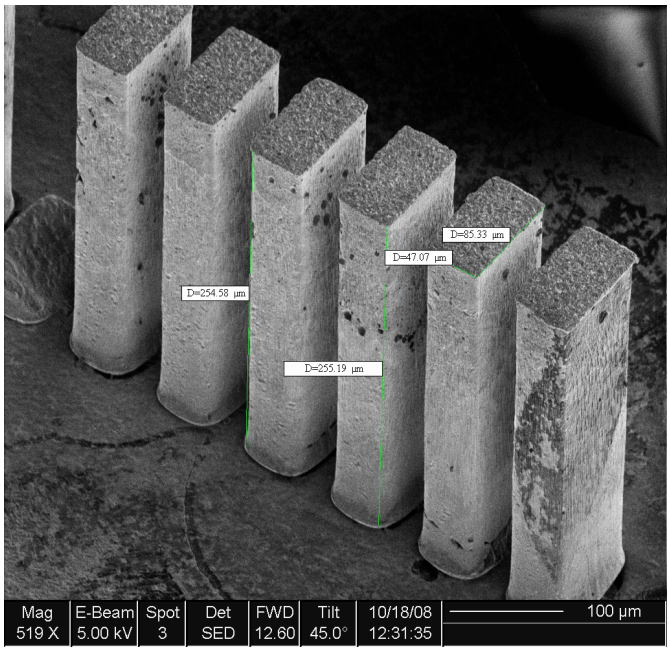

Figure 2. Electroformed Nickel Micro Pillars [2].

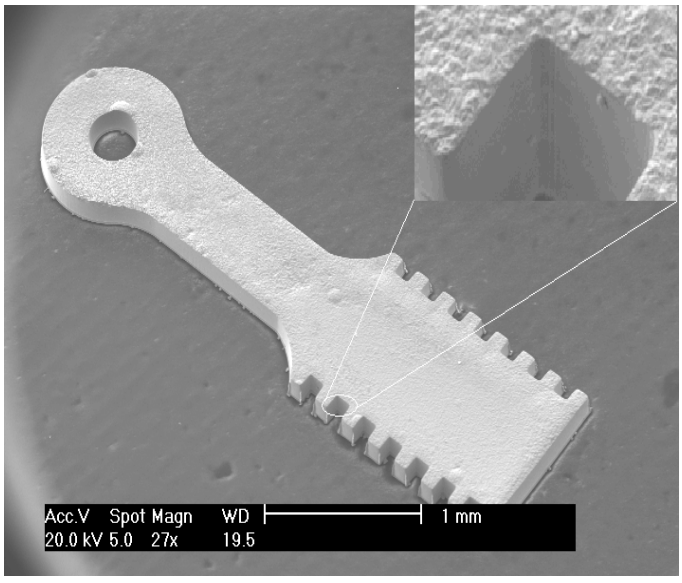

Figure 3. Electroformed Micro Linkage of Ni/Al2O3 Nanocomposite [3].

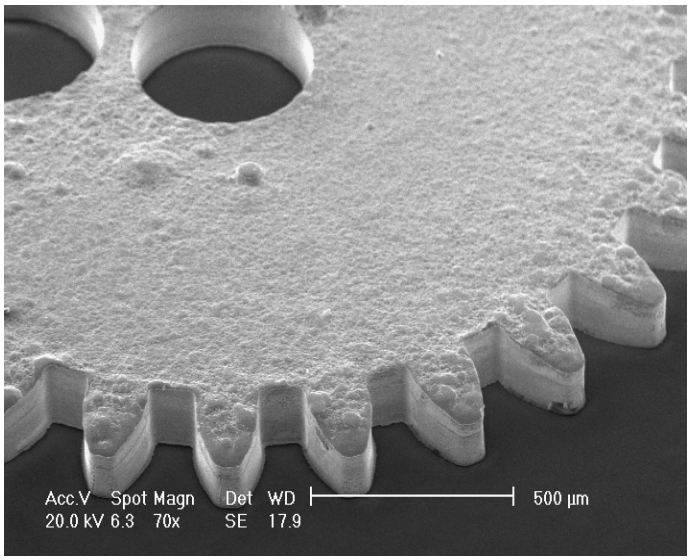

Figure 4. Electroformed Micro Linkage of Ni/Al2O3 Nanocomposite [4].

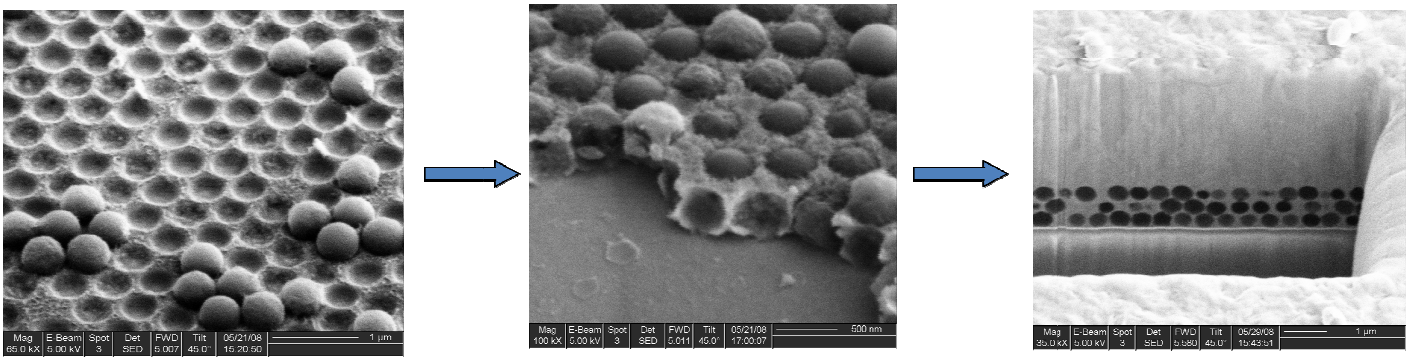

Figure 5. Electroformed Nickel Nanostructures through Self-Assembled PS Nanospheres [5].

References:

[1] M. L. Ke, Y. Wang, X. Wei, K. Jiang and M. J. Lancaster, Precision microfabrication of millimeter wave components. Proceedings of the 9th International Conference and Exhibition on Laser Metrology, Machine Tool, CMM and Robotic Performance, London, July 2009.

[2] X. Wei, C-H Lee, Z. Jiang and K. Jiang, Thick photoresists for electroforming metallic microcomponents, Proc. IMechE Part C: J. Mechanical Engineering Science, 222 (2008) 37 – 42.

[3] X. Wei, Z. Zhu, P. D. Prewett and K. Jiang, Fabrication of Ni–Al2O3 Composite Microcomponent by Electroforming, Microelectronic Engineering, 84 (2007) 1256–1259.

[4] X. Wei and K. Jiang, Synthesis and characterization of nanoparticulates strengthened nickel microcomponents. Advances in Science and Technology, 54 (2008) 299 – 304.

[5] X. Wei, X. Chen and K. Jiang, Fabrication of Nickel Nanostructure Arrays via a Modified Nanosphere Lithography, Nanoscale Research Letters, In Print, DOI 10.1007/s11671-010-9770-3.