

Abstract Submitted
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High-Aspect-Ratio Metal Microfabrication by Nickel Electroplating of Patterned Carbon Nanotube Forests DALLIN BARTON, LAWRENCE BARRETT, STEVEN NOYCE, DAVID ALLRED, RICHARD VANFLEET, ROBERT DAVIS, Brigham Young University — We have developed a process that is able to create metallic MEMS with over 20:1 aspect ratios through nickel electroplating patterned carbon coated carbon nanotube forests. Densities include about 85% bulk nickel ($7.3\text{--}7.98\text{ g/cm}^3$) with an elastic modulus of approximately 42 GPa and a strength of 400 MPa. 7 mN actuation forces were achieved. Applications for a wealth of actuators and similar MEMS devices could be envisioned with this composite material. The process of nickel electroplating carbon nanotube forests will be explained along with material properties testing.

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