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Generation of solids from carbon monoxide gas using microplasma discharge[1] SANIL JOHN, ASHLEY LEIBHAM, Lynntech, Inc. — Extended solids are a class of materials reported to possess advanced optical, mechanical and energetic properties. They are solid phases of simple gas molecules such as carbon monoxide (CO) that are created at extremely high pressures in very small batches. [1] Lab-scale dielectric barrier discharge reactors were used in recent studies to generate CO-derived solids at atmospheric pressure. [2], [3] These solids were obtained as deposits on dielectric surfaces in pure CO plasma and were reported to be a polymerized form of CO with a molecular structure similar to CO-based extended solids. Our work studied the generation of CO-derived solids in a DC microplasma discharge jet because it enables separation of the solid product from the "hot" plasma zone, deposition on a variety of substrates, and collection of the product without reactor disassembly. Two types of CO-derived solids were obtained by changing the microplasma operating condition. The scalability of the microplasma technique for production of CO-derived solids was demonstrated. [1] Lipp, M. J. et al, Nature Mater. 4, 211-215 (2005). [2] Geiger, R. and Staack, D., J. Phys. D: Appl. Phys. 44, 274005 (2011). [3] Belov, I. et al, Plasma Process and Polymers, 14, 1600065 (2017).

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