

Abstract Submitted  
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**Tunneling spectroscopy of multi-shell carbon fullerenes<sup>1</sup>** KEITH DOORE, MATT COOK, ERIC CLAUSEN, TIM KIDD, ZHIPENG YE, GAIHUA YE, RUI HE, ANDREW STOLLENWERK, University of Northern Iowa — Carbon allotropes such as fullerenes and nanotubes have generated considerable interest due possible exploitation of their mechanical and electrical properties for practical applications. Carbon onions are a type of fullerene consisting of multiple spherically concentric shells of curved graphitic sheets. Compared to single-shell fullerenes, few studies have been directed toward understanding the structural and electrical properties of carbon onions. Because carbon onions have proven difficult to fabricate in a controlled method, most of these studies have focused on synthesis methods. In this study, we investigate the electrical properties of carbon onions using a scanning tunneling microscope. Carbon onions were fabricated using ultrasonic agitation to break down isopropanol facilitated by a MoS<sub>2</sub> catalyst. Particles suspended in the remaining solution were deposited onto atomically flat HOPG substrates. Scanning tunneling spectroscopy indicate that carbon onions can exhibit both metallic and semiconducting properties, similar to carbon nanotubes.

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