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Superconductivity of granular Bi nanowires fabricated by electrochemical deposition at ambient condition MINGLIANG TIAN, JINGUO WANG, TIANHENG HAN, YOJI KOBAYASHI, NITESH KUMAR, SHENGYONG XU, YING LIU, THOMAS MALLOUK, MOSES CHAN, Penn State University, University Park, PA 16802 — Rhombohedral bulk Bi is a semimetal which is not superconducting down to low temperatures under ambient pressure. Amorphous Bi films and bulk Bi subjected to high pressure can be superconducting. We report here the observation of superconductivity of Bi nanowires (the diameter ranges from 40 to 100 nm) fabricated by electrochemical deposition at room temperature under atmospheric pressure. The superconducting transition temperature T_c , depending on the sample morphology, can be either of 3.7 K, 7.2 K or 8.3 K, which correspond exactly to the T_c 's reported for the three high pressure Bi phases (II, III and V). However, structural studies showed that these superconducting Bi nanowires showed granular morphology consisting of rhombohedral Bi particles oriented along the [001] direction. Because the superconducting Bi wires did not show any detectable diamagnetic signature, the observed superconductivity might be related to the interfacial structures of the granular wires. Further studies are in progress. *This work is supported by the Center for Nanoscale Science (Penn State MRSEC) funded by NSF under grant DMR-0213623.*

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