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Formation of Periodic 2D Metallic Nanostructures by Template-Assisted Electrodeposition MU WANG, BO ZHANG, YUYAN WENG, RUWEN PENG, NAIBEN MING, Department of Physics, Nanjing University, Nanjing 210093, China — Two-dimensional ordered metallic nanostructures on solid surface with specific patterns may have potential applications in photonics and optoelectronics. Yet it remains a challenge to produce regular nanostructures over a large area with low cost and with a simple method. Here we report a novel method to fabricate well-aligned copper nanowire array on silicon surface by template-assisted electrodeposition. The template is introduced onto silicon surface by nanoimprinting. With our previously reported unique electrodeposition system [1-2], we find that the array of straight copper wires with their width varying from 400 nm to 20 nm can be fabricated. The wire width can be tuned by the control parameters in electrodeposition. It is shown that this method is not limited to straight wires only. It can be used to form more complicated patterns. The physical properties of the metallic nanostructures are also discussed. [1] M. Zhang, S. Lenhert, M. Wang, L. Chi, et al., Adv. Mater. 16, 409 (2004) [2] M. Wang, S. Zhong, X. Yin, J. Zhu, et al., Phys. Rev. Lett., 86, 3827 (2001)

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