

Electric tweezers

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Electric tweezers utilize DC and AC electric fields through voltages applied on patterned electrodes to manipulate nanoentities suspended in a liquid. Nanowires with a large aspect ratio are particularly suitable for use in electric tweezers for patterning, assembling, and manipulation. Despite operating in the regime of extremely small particle Reynolds number (of order 10–5), electric tweezers can manipulate nanowires with high precision to follow any prescribed trajectory, to rotate nanowires with controlled chirality, angular velocity and rotation angle, and to assemble nanowires to fabricate nanoelectromechanical system (NEMS) devices such as nanomotors and nano-oscillators. Electric tweezers have also been used to transport in a highly controlled manner drug-carrying functionalized nanowires for cell-specific drug delivery.

Biography

Donglei (Emma) Fan is an Assistant Professor in Department of Mechanical Engineering of the University of Texas at Austin since 2010. She received her bachelor's degree in chemistry from the Department of Intensive Instruction, an honor program for gifted youth, in Nanjing University, China, in 1999, and doctoral (2007) degrees in Materials Science and Engineering from the Johns Hopkins University (JHU). Between 2007 and 2009, she was a Postdoctoral Fellow at JHU. Prof. Fan's work has spurred a series of publications on high impact journals including Nature Nanotechnology, the Proceedings of National Academy of Science, Nano Today, Physical Review Letters, Applied Physics Letters, as well as two pending patents. Her work was widely reported by the academic news media such as Nature Nanotechnology, MRS Bulletin, PhysOrg.com, APS news, and had been selected multiple times by Virtual Journals of Nanoscale Science and Technology. She wins the prestigious National Science Foundation CAREER award in 2012.

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