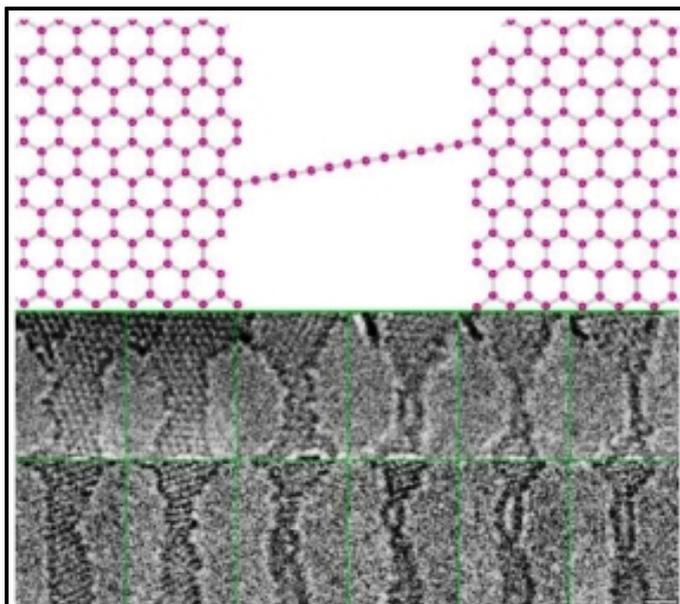


Atomic Chains are the New Hot Nanotech

Michael Berger

Editor's Note: I've been waiting for molecule-chain (now atomic chain, I guess) products since I read [Larry Niven's](#) [1] "Tales of Known Space" as a teen.



Formation of free-standing carbon atomic chains. Top: schematic representation of a carbon atomic chain. Bottom: An image gallery showing two examples for the dynamics for formation of free-standing carbon atomic chains from graphene nanoribbon through the controlled electron beam irradiation induced sputtering. Scale bar = 1 nanometer. (Image: Dr. Kazu Suenaga/AIST)

([Nanowerk](#) [2] Spotlight) Theoretical studies have long predicted that the exceptional physical and chemical properties of a rigid monatomic linear chain of carbon atoms could function as the component of molecular devices, for instance in nanoelectronics. The problem has been that there was no reliable and effective way to produce these carbon chains and therefore scientists couldn't study them experimentally.

While linear carbon chains have been already prepared either in solution or by vaporizing graphite, researchers in Japan have for the first time succeeded to derive the carbon atomic chains from graphene in a well controlled manner.

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Published on Electronic Component News (<http://www.ecnmag.com>)

"Our approach to realize freestanding carbon atomic chains employs energetic electron irradiation inside a transmission electron microscope," Kazu Suenaga explains to Nanowerk. "A graphene nanoribbon was continuously thinned from its two open ends by removing carbon atomic rows. This thinning process stops when the number of carbon atomic rows becomes two or one. This way we could reproducibly fabricate single and double freestanding carbon atoms chains."

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