

New type of nanowires, built with natural gas heating

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From top left are Professor Soojin Park, Dr. Sinho Choi, researcher Jieun Kim (KRICT) and from bottom left are Professor Sang Kyu Kwak and researcher Dae Yeon Hwang. Credit: UNIST. Contents by: Sinho Choi, Design by: Dukgi Lee

A team of Korean researchers, affiliated with UNIST has recently pioneered in developing a new simple nanowire manufacturing technique that uses self-catalytic growth process assisted by thermal decomposition

of natural gas. According to the research team, this method is simple, reproducible, size-controllable, and cost-effective in that lithium-ion batteries could also benefit from it.

In their approach, they discovered that germanium nanowires are grown by the reduction of germanium oxide particles and subsequent self-catalytic growth during the [thermal decomposition](#) of natural gas, and simultaneously, carbon sheath layers are uniformly coated on the nanowire surface.

This study is a collaboration among scientists, including Prof. SooJin Park (School of Energy and Chemical Engineering) and Prof. Sang Kyu Kwak (School of Energy and Chemical Engineering), Dr. Sinho Choi (UNIST), Combined M.S./Ph.D. Student Dae Yeon Hwang (UNIST), and Researcher Jieun Kim (Korea Research Institute of Chemical Technology).

In a study, reported in the January 21, 2016 issue of *Nano Letters*, the team demonstrated a new redox-responsive assembly method to synthesize hierarchically structured carbon-sheathed germanium nanowires (c-GeNWs) on a large scale by the use of self-catalytic growth process assisted by thermally decomposed [natural gas](#).

According to the team, this simple synthetic process not only enables them to synthesize hierarchically assembled materials from inexpensive metal oxides at a larger scale, but also can likely be extended to other metal oxides as well. Moreover, the resulting hierarchically assembled nanowires (C-GeNWs) show enhanced [chemical](#) and thermal stability, as well as outstanding electrochemical properties.

The team states, "This strategy may open up an effective way to make other metallic/semiconducting nanomaterials via one-step synthetic reactions through an environmentally benign and cost-effective

approach."

More information: Sinho Choi, Jieun Kim, Dae Yeon Hwang, Hyungmin Park, Jaegwon Ryu, Sang Kyu Kwak* and Soojin Park* "Generalized redox-responsive assembly of carbon-sheathed metallic and semiconducting nanowire heterostructures". *Nano Lett.* (2016)

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