Fabrication of 3-Dimensional Silver Nanoparticles and Nanowires on CD Disk

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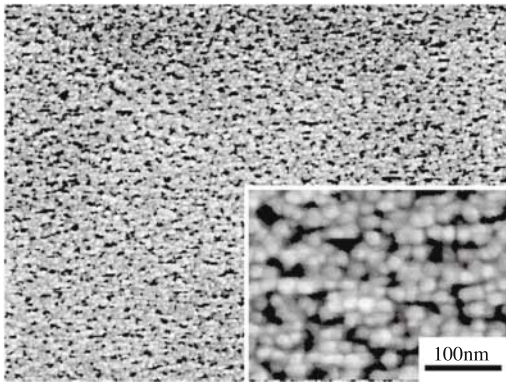
Novel metal nanoparticles or nanowires have attracted an attention in physics and chemistry because of their unique characteristics on electrical conductivity and electrical field enhancement by localized surface plasmons. However, the simple and cheap fabrication methods have not been available so far. At LAOTECH in AIST, an easy but very valuable method was developed by the chemical decomposition of silver oxide thin film in a gas mixture of hydrogen and oxygen. By controlling the gas mixture ratio and pre-treatment of a vacuum chamber, we can convert the silver oxide film into 3-dimentionally deposited silver nanoparticles (each diameter~20 nm) or nanowires.



Silver nanoparticles generated by deoxidation of silver oxide layer under a gas mixture of hydrogen and oxygen (3:1) for 5 min. Inset is the expanded image

Preparations of Hexagonal Tin- or Niobium Phosphate

- A Novel Anion-Exchangeable Nano Material -

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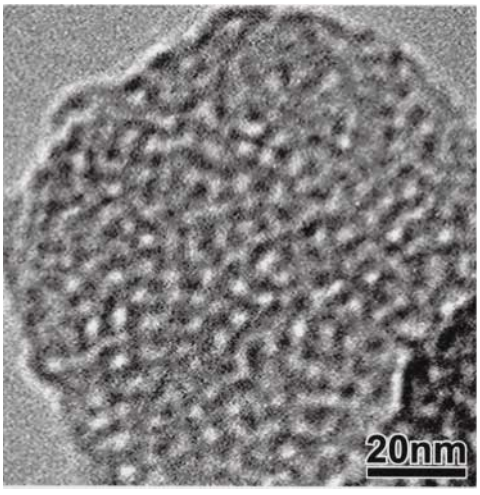
Tin- and niobium phosphates were prepared from phosphoric acid with the corresponding metal chloride in the presence of suitable surfactants. The pore structures of these phosphates were hexagonal. These metal phosphates possess excellent anion exchange capacities. Especially in the case of niobium phosphate, 6.3 mmol-eq/g of capacity was observed, which is higher than common anion exchangeable resins. This is due to the charge balance of cations both on phosphorus and niobium. This unique property of these phosphates is expected to create some novel application of nanotechnology.



TEM images of calcined niobium phosphate