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Recent *In situ* wet cell TEM study on nanomaterials and nano devices

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Abstract

An *in situ* wet cell TEM set up was made and used to study various nanomaterials and nano devices. In the set up, liquid samples were sealed between two ~50 nm thick Si_3N_4 windows, which prevented liquid leaking into the vacuum system, while allowed electron beam penetration for the TEM analysis. Gold and silver nano particle in aqueous solution samples were characterized, image resolutions better than 1 nm have been obtained. Both discrete particle and nano cluster forms were observed in the two samples. Dynamic behaviors in these aqueous systems were observed and analyzed. A suspension of silver/polypyrrole (Ag/ppy) sample was further prepared and characterized with this set up, and the Ag nano cores and the ppy nano shells were clearly observed from the nano composites in solution. Moreover, thin film electrodes were deposited onto the Si_3N_4 windows, forming electrochemical devices with liquid electrolytes sealed in the wet cell. The electrodes were connected to the outside testing system through thin wires, and nanoscale electrochemical cycling behaviors in the wet cell have been successfully observed. *In situ* wet cell TEM represents a recent trend in nano technology, and many exciting new developments are being expected in this field.

Biography

Xin Chen has completed his Ph.D. at the age of 33 years from University of Houston and postdoctoral studies from University of Houston. He served as Visiting Research Assistant Professor in University of Illinois at Urbana-Champaign, and he is now Shanghai Thousand Plan Professor in East China University of Science and Technology. He has published more than 30 papers in reputed journals, made invited talks in several international conferences, and edited a book. He is a referee of over 15 reputed journals, and he has served as committee member in several reputed research societies and international conferences.