

Preparation of 1D Nano-Polyaniline/Dendritic Silver Composites

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Abstract : In this paper, an interesting and easy method to prepare one-dimensional nanostructured polyaniline/dendritic silver composites is reported. It is well known that the morphology of metal particle is a very important factor to influence the properties of polymer-metal composites. Usually, the dendritic silver is prepared by kinetic control in reduction reaction. It is not a thermodynamically stable structure. It is the goal to reduce silver ion to dendritic silver by polyaniline polymer via kinetic control and form one-dimensional nanostructured polyaniline/dendritic silver composites. The preparation is a two steps sequential reaction. First step, the polyaniline networks composed of nano fibrillar polyaniline are synthesized from aniline monomers aqueous with ammonium persulfate as the initiator at room temperature. In second step, the silver nitrate is added into polyaniline networks dispersed in deionized water. The dendritic silver is formed via reduction by polyaniline networks under the kinetic control. The formation of polyaniline is discussed via transmission electron microscopy (TEM). Nanosheets, nanotubes, nanospheres, nanosticks, and networks are observed via TEM. Then, the mechanism of formation of one-dimensional nanostructured polyaniline/dendritic silver composites is discussed. The formation of dendritic silver is observed by TEM and X-ray diffraction.

Keywords : 1D nanostructured polyaniline, dendritic silver, synthesis

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