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Polymer-Based Nanocomposites for Functional Applications

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Co-authors and Abstract

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Hybrid materials consisting of metal nanoparticles dispersed in a dielectric matrix are the subject of extensive research due to their novel functional properties offering hosts of new applications. Polymers are particularly attractive as matrix. Consequently, various approaches have been reported to incorporate metal nanoparticles into polymers. The present talk is concerned with the preparation of polymer-based nanocomposites by vapor phase co- and tandem deposition and the resulting functional properties. The techniques involve evaporation [1] and sputtering [2], respectively, of metallic and organic components and inter alia allow the preparation of composites which contain alloy clusters of well defined composition. Emphasis will be placed on soft-magnetic high frequency materials with cut-off frequencies well above 1 GHz [3] and optical composites with tuned plasmon resonances suitable for ultra thin color filters, Bragg reflectors, and other devices [4-6]. In addition, antibacterial coatings [7] will be addressed. Moreover, a novel approach to produce magnetic nanorods for potential applications in high-density data storage and other fields will be presented [8].

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