Nanocomposites combine favorable features of the constituents on the nanoscale to obtain new functionalities. The present talk is concerned with the preparation of polymer-based nanocomposites consisting of metal nanoparticles in a polymer matrix and the resulting functional properties [1]. Emphasis is placed on vapor phase deposition [2,3] which inter alia allows the incorporation of alloy clusters with well defined composition and tailored filling factor profiles. Examples presented include optical composites with tuned particle surface plasmon resonances for plasmonic applications [4,5], magnetic high frequency materials with cut-off frequencies well above 1 GHz [6], sensors that are based on the dramatic change in the electronic properties near the percolation threshold [7], and antibacterial coatings which benefit from the large effective surface of nanoparticles and the increased chemical potential which both strongly enhance ion release [8]. Moreover, photoswitchable composites containing chromophores and nanoparticles will be addressed [9].

**Keywords:** nanocomposites, vapor phase deposition, plasmonics, high frequency, antibacterial, sensors, photoswitchable