

The aim of this work is to prepare heterogeneous nanoparticles which means nanoparticles composed of more than one material. Our approach lies in in-flight modification of primary nanoparticles in the tubular sputtering system. Our tubular system contains copper target and we deposit copper onto the flying primary nanoparticles by magnetron sputtering. The main advantage of this approach is independence of fabrication of primary nanoparticles and their subsequent modification. At first we optimized fabrication of nanoparticles by the gas aggregation source on behalf of the next modification. We also characterized conditions in the tubular sputtering system. We found process in the tubular system to be very complex and sensitive to the changes of the operational parameters. There is a strong interaction between flying nanoparticles and the discharge in the tubular system. Due to this interaction the nanoparticles are trapped in the plasma and the deposition rate is pulsing. The result of this work is modification of nickel and silver nanoparticles, preparation of heterogeneous nanoparticles Ni/Cu and Ag/Cu. These heterogeneous nanoparticles vary in composition, shape and size according to the conditions in the tubular system. We also successfully prepared Janus nanoparticles which are interesting for their large application potential.