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**Influence of He:Ar ratio on the size distribution of nano-size cluster ions produced by high pressure magnetron sputtering.**

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Polymer / metal cluster nanocomposites with tailorable properties are interesting materials for technological applications [1]. Therefore, the control of basic parameters like metal filling factor, particle size distribution, and composition of particles is required [2]. Gas aggregation sources based on magnetron sputtering offer a precise process control. It is known that determination of cluster sizes only by electron microscopy can be misleading. Atoms as well as small clusters can move on the substrate and aggregate to larger clusters. Therefore, other methods for the determination of cluster parameters are required.

In this work an Ag cluster beam produced by a home-built magnetron cluster source [3] was analyzed using a commercial quadrupole mass filter (QMF200, Oxford Applied Research) to obtain the dependency of the cluster size distribution on the He fraction. Measured dependencies of the cluster size distribution on the He:Ar ratio show that cluster size distribution becomes narrower and shifts towards smaller sizes with increasing He flow. More He not only enhances the growth of large clusters from the cluster seeds; it also creates more nucleation of these seeds. When the latter process becomes dominant, the cluster size will be smaller, assuming that the amount of sputtered material does not change with the He pressure [4].

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**Keywords**

Ag nanoparticles

magnetron sputtering

Ag cluster films

mass spectrometry

gas aggregation