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Effect of the electrostatic interaction in the coagulation of nanoparticles in argon-silane plasma simulations BENJAMIN SANTOS, FRANÇOIS VIDAL, LAURA CACOT, CLAUDE BOUCHER, INRS - Energie et Materiaux — It is known that nanoparticles in low-temperature plasmas are mostly charged negatively. Recently Mamunuru et al. [1], pointed out the existence of positively charged and neutral nanoparticles. This possibility promotes the coagulation because of the Coulomb interaction enhancement between particles of opposite charge. Moreover, Ravi et al. [2] studied the coagulation enhancement between neutral and charged nanoparticles, which is due to the image potential. In this work, we extended the study on the effects of the electrostatic interaction between nanoparticles on particle growth in an argon-silane low-temperature plasma. For this purpose, we developed a computer simulation based on the general dust-plasma self-consistent model established by the Girshick's group [3], but we use a more rigorous approach, which includes polarization induction for calculating the electrostatic force between dielectric particles. It is shown that the coagulation is enhanced in neutral-charged particles encounters but in a lesser way than the previous study [2]. Detailed results will be discussed during presentation.

[1]Plasma Chem Plasma Process 37, 701715 (2017).
[2]Phys. Rev. E 79, 26408 (2009).
[3]Plasma Chem Plasma Process 34, 115 (2013) and references therein.

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