Spontaneous alteration of metallic particle to the nitride or oxide in plasma field.

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By passing through into the plasma field of the Al and Si nanoparticle which were produced just bellow the plasma field, metallic particles such as Al and Si nanoparticles altered spontaneously to the AlN, Si3N4 nanoparticles in the mixture gasses of He and N2 at 10 Torr (9.75 Torr He, 0.25 Torr N2)[Ref.1].

In the present paper, results of Ga, In, Sn , Co and V have been presented. Since Ga, In and Sn particles were existed as the liquid drop in the plasma field covered with amorphous nitride layer, the alteration process was different from solid particles such as Co, V, Al and Si.

Very small amounts of nitrogen or oxygen can be altered the metallic particle with the size of a few tens of nanometers to the compounds nanoparticle.

In order to alter the compounds particles, the difference of phonon mean free path due to the liquid, amorphous and crystal affected the power of plasma field and nitrogen or oxygen partial pressure. All analysis on these nanoparticle have been done on the transmission electron microscopy.

[Ref.1] T.Sato et al., Surface Review and Letters Vol. 10 (2003) p435