

Electronic Supporting Information

Electrochemical Ostwald Ripening and Surface Diffusion in Galvanic Displacement Reaction: Control over Particle Growth

Tapas Ghosh[†], Prasanta Karmakar[‡] and Biswarup Satpati^{*,†}

*[†]Surface Physics and Material Science Division, Saha Institute of Nuclear Physics, 1/AF
Bidhannagar, Kolkata-700064, India*

[‡]Variable Energy Cyclotron Centre, 1/AF, Bidhannagar, Kolkata 700064, India

*E-mail: biswarup.satpati@saha.ac.in

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Figure. S1 STEM-HAADF images of Ag nanoparticles on amorphous Ge (substrate 1) and crystalline Ge substrates (substrate 2).

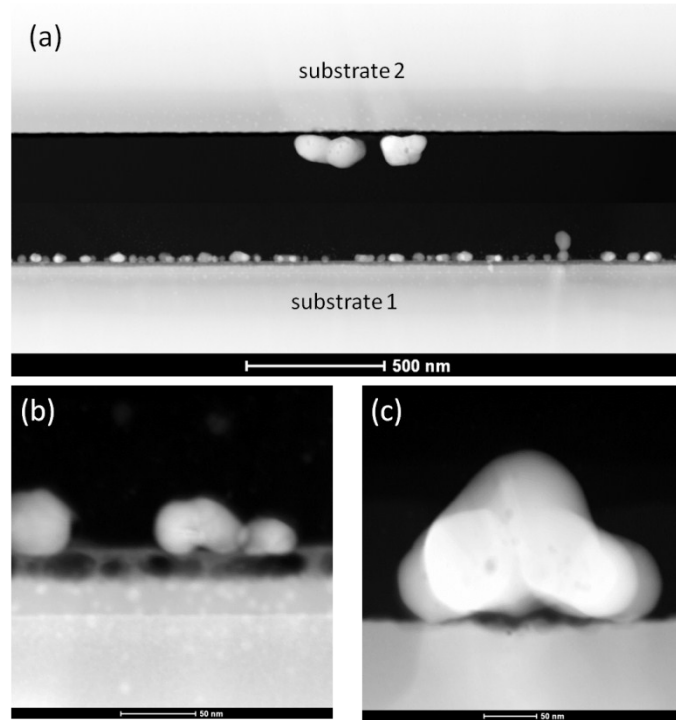


Fig. S1. (a) STEM-HAADF images of Ag nanoparticles on Ge substrates. Magnified images, on (b) amorphous and (c) crystalline substrate.

Figure. S2: Elemental analysis for the Ag nanoparticles deposited on O^+ ion bombarded Ge: EDX elemental line profiles in Figure S2 b,c show the locations of different element along the line 1 and 2 drawn in Figure S2 a. The scan along the line 1 gives Ag peak (see Figure S2 b) when X-ray was collected from the brighter (high-Z) object on the Ge surface and it's absence along the line profile 2 (see Figure S2 c) as the line does not passing through such brighter object. An elemental mapping has also been presented in Figure S2 d, where the blue and magenta color represents the Ag and Ge elements, respectively.

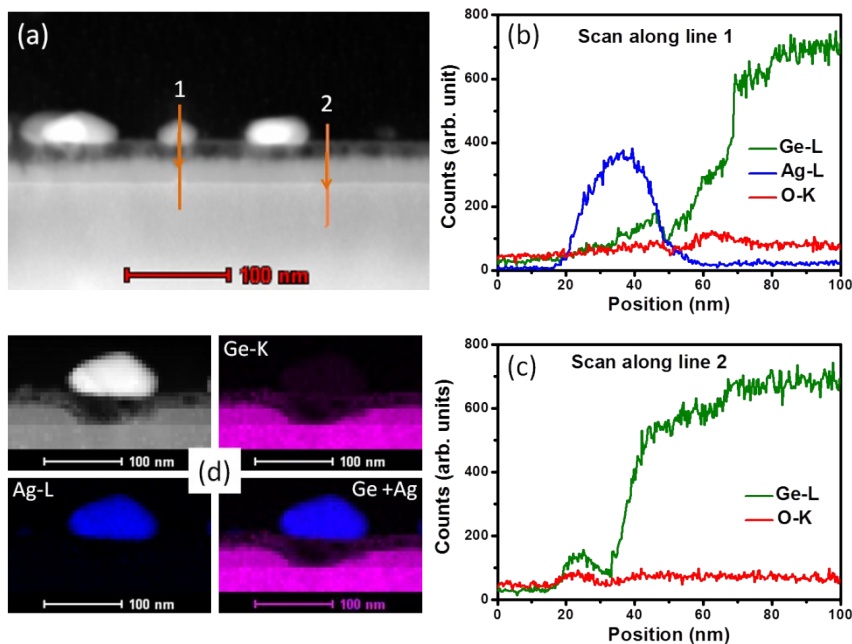


Figure S2. (a) STEM-HAADF image. (b) EDX elemental line profile along the line 1. (c) EDX elemental line profile along the line 2. (d) STEM-HAADF, elemental mapping using Ge-K, Ag-L lines and composite image.

Figure S3: Elemental analysis for the Ag nanoparticles deposited on Ar²⁺ ion bombarded Ge surface. EDX elemental line profiles in Figure S3 b,c show the locations of different element along the line 1 and 2 drawn in Figure S3 a. The scan along the line 1 gives Ag peak (see Figure S2 b) when X-ray was collected from the brighter (high-Z) object on the Ge surface and it's absence along the line profile 2 (see Figure S3 c) as the line does not passing through such brighter object.

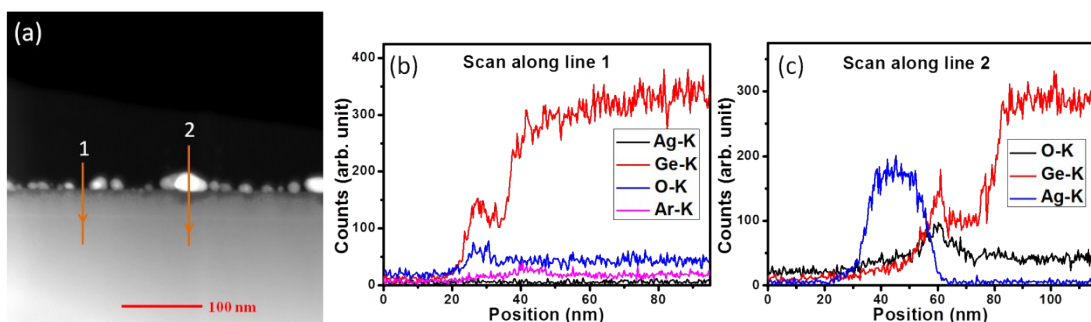


Figure S3. (a) STEM-HAADF image of the Ag nanoparticles grown on Ar ion bombarded Ge substrate. (b, c) EDX elemental line profile along the line 1 and line 2, respectively shown in (a).

Figure S4: Plan view TEM images and corresponding particle size distributions of Ag nanoparticles deposited on n-type and p-type Ge for different interval of time.

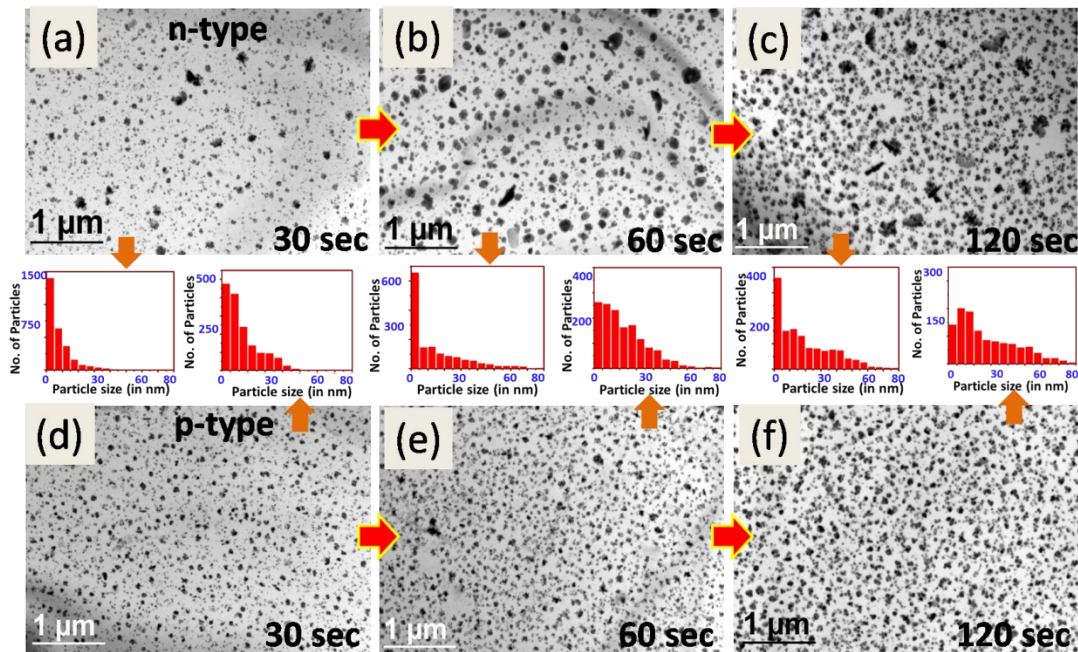


Figure S4. Plan-view TEM images of Ag nanoparticles deposited on n-type and p-type c-Ge substrate of same resistivity ($0.3 \Omega\text{cm}$) for (a) & (d) 30 sec, (b) & (e) 60 sec, (c) & (f) 120 sec, respectively. The corresponding particle size distributions are shown by orange color arrows.

Table S1. Summary of the results presented in Figure S4.

Substrate	Time of deposition	Particle counts	% of areal coverage	Mean size (nm)	Standard deviation (nm)
n-type	30 sec	2891	11.60	9.1	10.8
	1 min	1571	26.01	17.6	22.7
	2 min	1390	30.78	22.8	24.2
p-type	30 sec	1610	15.55	17.1	13.6
	1 min	1499	25.22	23.8	16.5
	2 min	1230	29.78	28.8	19.3