SEM Imaging of Films of Metal Nanoparticles Deposited on Semiconductors

Piksová K.[a], Grym J.[b], Procházková O.[b], Žďánský K.[b], Zavadil J.[b], Yatskiv R.[b], Fiala P.[a]

[a]*Department of Physical Electronics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Břehová 7,115 19 Prague 1, Czech Republic*

[b]*Institute of Photonics and Electronics AS CR, Chaberska 57, 18251 Prague 8, Czech Republic*

katerina.piksova@fjfi.cvut.cz

Layers of metal nanoparticles on semiconductor surfaces show interesting effects which may be desirable for practical applications. Association of metal nanoparticles with semiconductor materials opens up novel means to gain structures with remarkable properties.
Schottky barriers with layers of nanosized metal particles on semiconductor wafers can be used as hydrogen sensors which are more sensitive than those prepared by conventional deposition techniques.

Colloids of metal nanoparticles stabilized by AOT reverse micelles in isooctane were prepared. The colloids contain nanoparticles with the size distribution of 5-10 nm in diameter. Nanolayers were deposited by electrophoresis onto semiconductor wafers.

The morphology of the deposited layers was observed by JEOL JSM 7500F scanning microscope.

We discuss the influence of:

- conditions of the electrophoretic deposition, i.e. electrode polarity, time of the deposition and applied voltage,
- the post-deposition treatment, i.e. thermal annealing,
- the properties of deposited colloids

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References

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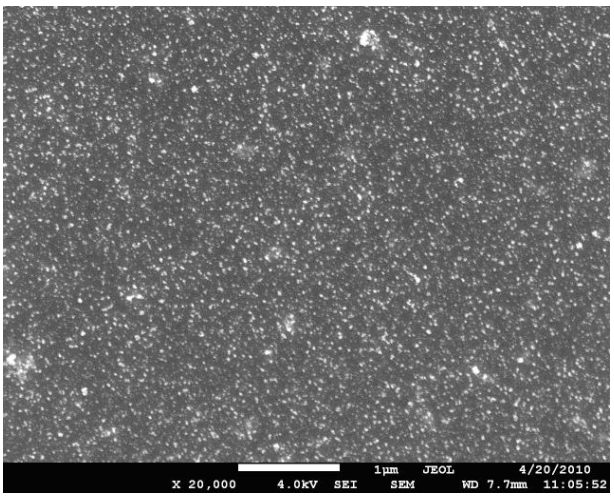
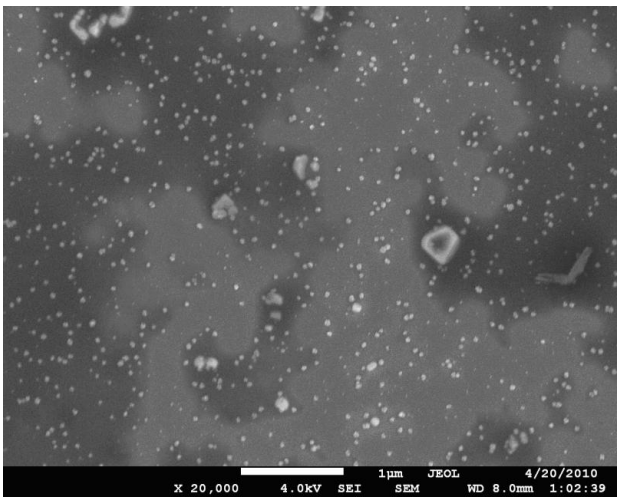
Figures:

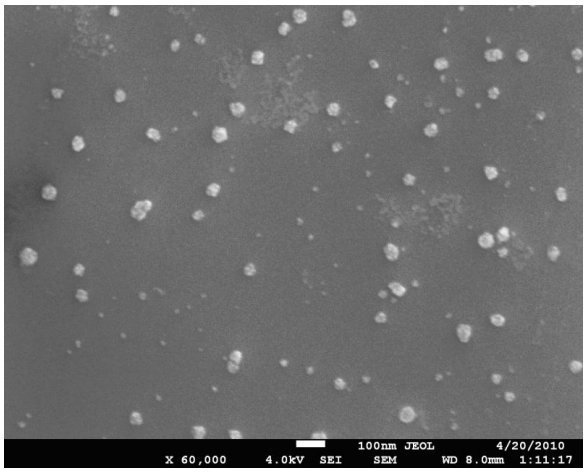


a) applied voltage - 100V

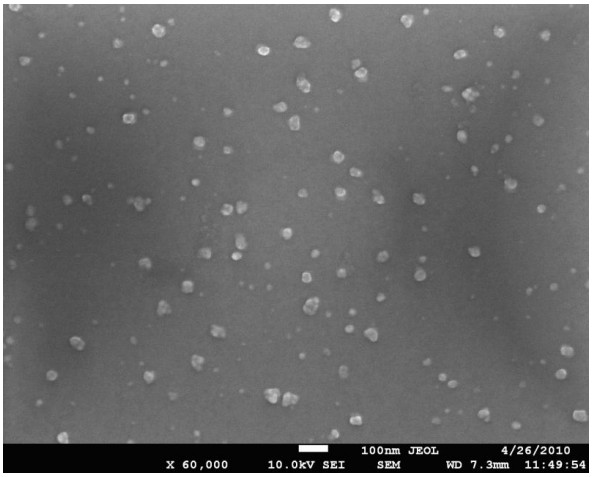


b) applied voltage - 30V

Fig. 1: Comparison morphology – dependence on applied voltage



a) non-annealed sample



b) annealed sample

Fig. 2: Comparison morphology – dependence on annealing