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液中プラズマ処理表面を用いた金属酸化物ナノ結晶合成

Synthesis of Metallic Oxides Nanocrystallites *via* Submerged Liquid Plasma Treatment

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Modern technologies that require the attachment of small devices, important in purpose for sensor arrays, light harvesting and functional catalysis effect is in highly demand. Herein, semiconductor metallic oxides, such as TiO_2 and ZnO, having the size features of nanometers across are widely been studied over the years with different applicable techniques. Several technologies, such as electron-beam lithography, laser irradiation, X-ray lithography, and plasmas technique have been examined for nanofabrication. However, there are major shortcomings, including (a) cost reduction inflexibility, (b) process complexity, and (c) quality variation in the end product.

We show in this presentation that a large variety of metallic oxides nanocrystallites can be synthesized by simply applying the raw metal surface treatment via submerged liquid plasma. Specifically, we demonstrate the synthesis of ZnO nanocrystallites on the base surfaces. The innovation of this method is the localization of metal oxides nanoparticles on reformed layer of the substrate material, where the reformed layer has a protrusion characteristic. Then, a breakthrough is revealed when immersion of the layer into water with ambient temperature and dark environment, resulting in the change cut of the aggregated nanoparticles into widely spread ZnO nanoflowers and nanorods. The surface morphology change is shown on Figure 1. The discussion of aforementioned results shall be done during the presentation session.

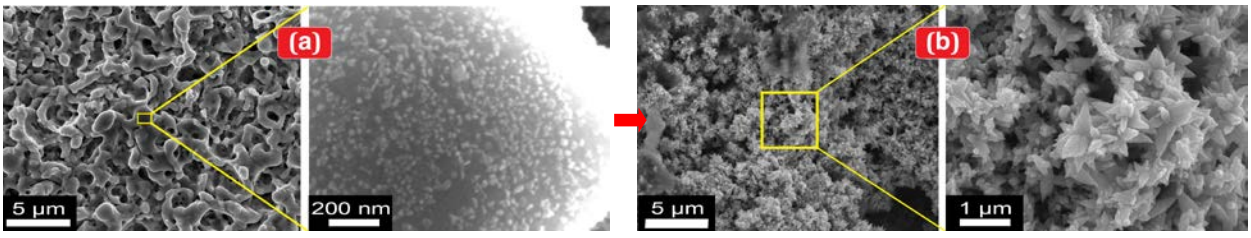

Figure 1| Scanning Electron Micrographs of surface morphology change on Zn plate substrate. The images were taken by JSM-2010F. **(a)** Submerged liquid plasma 140V, 10min effects the creation of protruded surface layer with localized metal oxides nanoparticles. **(b)** ZnO nanoflowers growth after 24h in water and dark environment.