
Application of multiphase media plasmas to nano-material treatment

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Low-temperature atmospheric-pressure plasma can be generated very easily by using pulse power technology. This capability of plasma has opened new aspect of plasma processing, namely, processing in multiple media composed of gas, liquid, and solid phase. The first topic of my talk is plasma generation in gas/liquid mixed medium. Although many researches have been conducted in plasma in liquid (solution plasma), very tiny plasma was used for processing in liquid. On the contrary, we can generate large number of tiny bubble plasmas in porous dielectric filled with gas/liquid mixed medium, which are named 3D integrated micro solution plasma. This provides several ten-fold higher performance in water purification. Another topic is thin film formation on liquid, namely, solution plasma. While plasma in contact with liquid has been extensively applied to synthesis of nano-particles dispersed in liquid phase, there are few reports on thin-film formation. We discuss application of plasma in contact with liquid to fabrication of nano-particle embedded functional thin films, which can be used various applications such as solar fuel cells and medical patch for cancer treatments.

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