

PO3017

Preparation and basic properties of plasma polymer fluorocarbon nano-particles

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Nano-particles of fluorocarbon plasma polymer were obtained by a gas aggregation cluster source based on radiofrequency magnetron sputtering of poly(tetrafluoroethylene). Spherical nano-particles with an average diameter of 30 nm were fabricated. Chemical composition close to original PTFE with the high retention (>80%) of the -CF₂ groups was reached. Thin films composed of the fluorocarbon nano-particles exhibited an increased roughness which resulted in super hydrophobic properties. Water contact angle on such films approached the value of about 180°. Changes of the basic physical properties and chemical composition with experimental parameters were also studied. The method used is advantageous for allowing one step, dry deposition of nano-structured films with high roughness and required chemical composition.

Keywords

nano-particles

magnetron sputtering

PTFE

hydrophobic