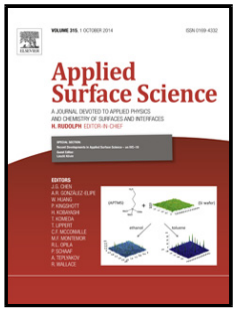

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Electrodeposited nanostructured cobalt film and its dual modulation of both superhydrophobic property and adhesiveness

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Abstract: We report a novel shell-like cobalt nanostructure prepared by galvanostatic electrochemical deposition which exhibit prominent superhydrophobic property. By adjusting the electroplating conditions, cobalt nanocrystals with different morphologies like nanocones and fluffy shells can be obtained while the hydrophobic and adhesive behavior of each after surface modification is observed. After a brief discussion on the growth mechanism of those shapes, we explained the lotus effect presented on such structures which would probably provide a strong evidence to the existing models of superhydrophobic surfaces. Based on the above, we propose a novel approach to modulate both adhesiveness and wettability of Co film by tuning of deposition parameters along with a simple heat treatment and dipping. With cobalt's anisotropic magnetic properties, such facile surface coating would be used in a wide range of applications such as commercial fabrication of tunable anti-corrosive magnetic devices.

Keywords: Superhydrophobic, Co thin films, Electrodeposition, Adhesion