Flower-like silver acetate bundle directly grow from silver globule
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Abstract: In this research, we investigated morphology of columnar silver acetate directly synthesized from silver globule in organic solvents. By immersing ~2 mm in diameter of silver globule in a solution containing ethyl acetate (EtOAc) : acetic acid (HOAc) : hydrogen peroxide (HP) of 10 : 1 : 1 by volume, the silver acetate (AgOAc) crystals slowly developed and grew into flower-like shape on the surface of the silver globule. The process continues until silver metal or HP or HOAc was exhausted. Under the employed condition, silver metal was completely consumed within 48 hours. The flower-shaped bundle of columnar AgOAc with diameter of 10-13 mm was obtained when the solution was not agitated. In the system with a continuous stirring, flakes of AgOAc bundles were obtained. Under an ultrasonic radiation, the flower-shaped AgOAc and bundle AgOAc disintegrated into an individual columnar AgOAc with ~1 µm width and 20-50 µm long. The morphology of the columnar AgOAc was investigated by optical microscope and scanning electron microscope. The developed process is a green synthetic protocol, energy efficient, no chemical waste, single step and simple. The columnar AgOAc can be employed as a precursor for flexible conductive circuit, conductive ink, and highly efficient surface enhanced Raman substrates.

Keywords: Silver Acetate; Green Synthesis; Columnar Structure