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Tungsten Oxide Nanostructures synthesized by Laser Pyrolysis

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<p>Laser pyrolysis has been used to synthesize tungsten oxide (WO3-x) nanostructures, and here we report on the production of six-sided nanostars. The proposed mechanism used to explain the growth of the stars is the concentration difference and gradient mechanism which speculates that a high local concentration of one reactant mixed with a low concentration of another reactant under ambient conditions, and the high concentration favoured the thermodynamic conditions for crystal growth and the low concentration resulted in a diffusion-controlled kinetic environment for growth of hierarchical structures. Apart from precursor concentration, further analysis was carried out to determine the influence of varying laser wavelengths and power densities in such experiments. The laser wavelength was varied between 9.22-10.82 ∂m at a fixed power density of 51.2 W/cm2, and the laser power density was varied between 17-110 W/cm2 at a fixed wavelength of 10.6 ∂m. Annealing the samples at 450oC in argon atmosphere for 17 hours appeared to be an essential step for further growth of nanostructures. Particle size and morphology were determined by scanning and transmission electron microscopy and the chemical composition was determined by x-ray diffraction studies in conjunction with Raman spectroscopy and energy dispersive x-ray spectroscopy to confirm the tungsten oxide phase as a function of the laser parameters.

Level (Hons, MSc,
   PhD, other)?

MSc

Consider for a student
   award (Yes / No)?

Yes

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

No

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