

Synthesis and applications of beryllium oxide nanowires

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We demonstrate a new method of BeO nanowire synthesis using structural changes induced by neutron irradiation of beryllium. Beryllium oxide nanowires with a diameter in range from 10 – 100 nm and length of 50 μm were obtained by a high temperature oxidation process in an atmosphere of low oxygen content.

Beryllium oxide is a material with a wide range of applications due to its unusual combination of optical, thermal, dielectric and mechanical properties. It can be assumed that this material with nanosized structure would have additional valuable properties for even more specific applications.

Chemical composition and structure of nanowires as well as their mechanical and optical properties were assessed concerning potential applications. TEM analysis revealed crystalline nature of the nanowires. However, two layer structure of large diameter (>50nm) nanowires was observed. The optical properties of the nanowires were compared to that of microstructured beryllium oxide powder. Emission spectra were measured for both BeO nanowires and powder by optical stimulation with different excitation wavelengths. A significant change of photoluminescence spectra were observed in beryllium oxide nanowires if stimulated by the ultraviolet and green excitation.

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