Contribution ID: **223** Type: **Poster Presentation**

Luminescent properties of Dy3+, Eu3+, Tb3+ and Sm3+ doped barium borate phosphors synthesized by solution combustion process.

Tuesday, 9 July 2013 17:40 (1 hour)

Abstract content
   (Max 300 words)

Powder phosphors of Dy3+, Eu3+, Tb3+ and Sm3+ doped barium borates were prepared by solution combustion reactions from mixed metal nitrate reactants and theourea (C2H4O) with ignition temperature of 500 oC. The X-ray diffraction patterns of as−synthesized powders revealed binary phases and that the barium borate phase does not crystallized directly from the combustion reaction with fuel to oxidizer ratio of ⊠2.0. Scanning electron microscope images powders showed agglomeration and a continuous three-dimensional hexagonal network. The large hexagonal agglomerates range in size between 20 and 50 ⊠m, while the primary spherical nanoparticles ranged in size between 50 and 100 nm. The phosphors prepared by combustion reaction were photo luminescent immediately after combustion without additional heating. The phosphors exhibited the characteristic emission spectrum of Dy3+, Eu3+, Tb3+ and Sm3+. Gridding was shown to reduce but heat treatment was shown to increase the PL intensities. The initial luminescent intensities were found to be dependent on concentration of RE3+ dopant while Tb doped materials displayed the longest afterglow properties.

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Session Classification: Poster1

Track Classification: Track A - Division for Condensed Matter Physics and Materials