

# Use of $\text{CaGd}_{2(1-x)}\text{Eu}_{2x}(\text{WO}_4)_4$ scheelite phosphors in thermometry

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Scheelites are  $\text{ABO}_4$  compounds (A = alkali, alkaline-earth or rare-earth element; B = Mo, W) with the best known scheelite being  $\text{CaWO}_4$ . In scheelite related compounds there is a partial substitution of the A and/or B cation and crystals can be aperiodic in 3-dimensional space. The advantage of this so-called incommensurate modulation is that varying the composition results in various order patterns which yield a wide range of materials with often good optical properties, good stability and a relatively simple preparation method [1]. Here, the optical properties of  $\text{CaGd}_{2(1-x)}\text{Eu}_{2x}(\text{WO}_4)_4$  are investigated. The very specific temperature-dependent luminescence of the high Eu-concentration samples allows the use of these materials as thermographic phosphor. Due to energy transfer in the material, the ratio of the line intensities of the Eu emission can be used as a highly sensitive thermometer in the range from 250 K to at least 500 K. A set-up was developed to prove the applicability of the material.

[1] C. Guo, H.K. Yang, and J.-H. Jeong, *Preparation and luminescent properties of the phosphor  $\text{MGd}_2(\text{MoO}_4)_4 : \text{Eu}^{3+}$* . Journal of Luminescence, 2010. **130**: p. 1390-1393.