

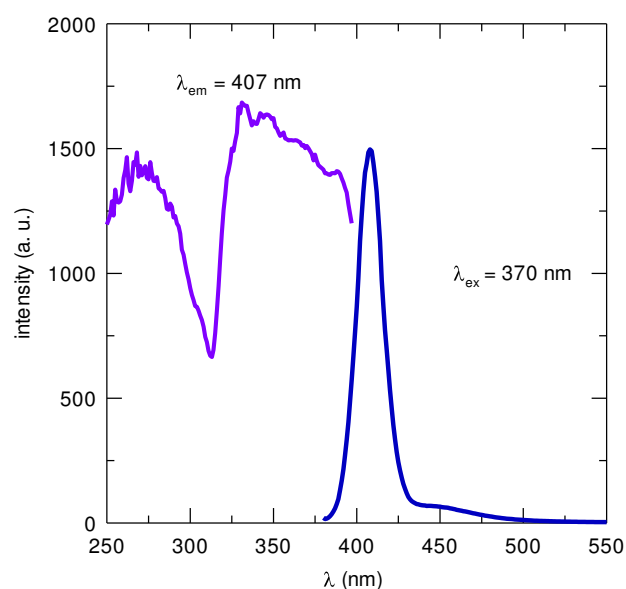
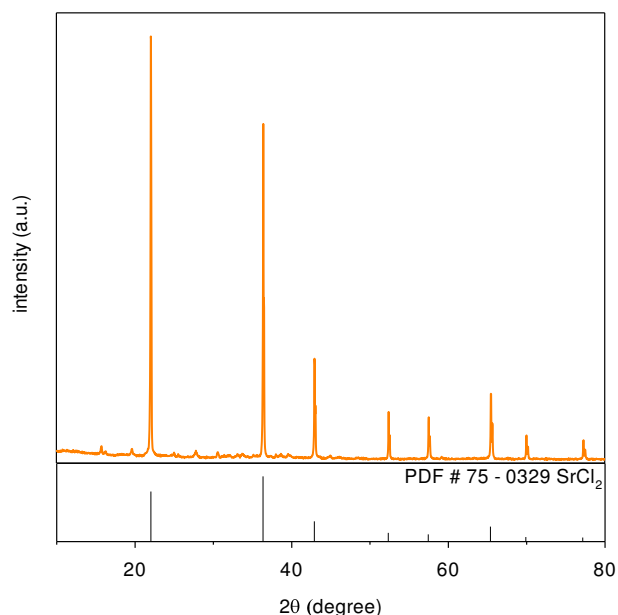
## Blue-emitting metal chloride phosphor: High color purity phosphor in near-UV for white LED applications

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Recently all the countries have suffered crisis in environment and energy. To overcome those crisis, it has been researched light emitting diodes (LEDs) having many advantages like high efficiency and eco-friendly. The alternative for the conventional light sources like fluorescent and incandescent light is white LEDs. Generally white light can be generated by yellow-emitting phosphor in combination with a blue emitting LED. This method, based on phosphor-down conversion, has high luminous efficiency ( $> 30$  lm/W), but a poor color-rendering index ( $< 65$ ) due to weak red emission is one of its main drawback. In this regard, a new class of WLEDs has been developed to guarantee excellent color-rendering properties compared to the conventional one e.g. near-ultraviolet LEDs (near-UV LEDs) combined with multi-phase phosphors.

In this study, we report a blue-emitting  $\text{Sr}_{2-x}\text{Eu}_x\text{Cl}_2$  phosphor by the solid-state reaction method. The structural and optical characteristics of the phosphor were investigated.  $\text{SrCl}_2$  has the unique distinction of being the only divalent metal chloride crystallizing in the cubic  $\text{Fm}3\text{m}$  symmetry without an established temperature dependent phase transition.<sup>(1)</sup> The  $\text{SrCl}_2:\text{Eu}^{2+}$  phosphor, which displayed good luminescence properties under near-UV excitation, could get high colour purity. Since having highly narrow half-width (FWHM), WLEDs based on a combination of an InGaN LED chip ( $\lambda_{\text{max}} = 365$  nm) with the  $\text{SrCl}_2:\text{Eu}^{2+}$ , green, and red phosphor have been fabricated and were discussed. The result of this work indicates that  $\text{SrCl}_2:\text{Eu}^{2+}$  could be a promising high purity phosphor as a blue component for white LEDs under a near-ultraviolet source.

Figure 1. PL intensity of  $\text{Sr}_{1.97}\text{Eu}_{0.03}\text{Cl}_2$  blue phosphor.Figure 2. XRD graph of  $\text{Sr}_{1.97}\text{Eu}_{0.03}\text{Cl}_2$  blue phosphor.**Reference**

1. H. Mark and S. Tolksdorf, Z. Phys. 33, 681 (1925).