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The effect of varying Cu²⁺ concentration on the structure and optical property of BaAl₂O₄: x%Cu²⁺ (0 ≤ x ≤ 1) nano-phosphors prepared using the citrate sol-gel method.

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Barium aluminates (BaAl₂O₄) are an important class of materials of the alkaline earth aluminates. BaAl₂O₄ phosphors are known for their high emission intensity and long afterglow. In this study, the emission from the BaAl₂O₄ is being further optimized by introducing Cu²⁺ ions within the host matrix. Here it is shown that BaAl₂O₄ has an optimum emission, when doped with 0.075% Cu²⁺ and excited by the 282 nm. BaAl₂O₄:Cu²⁺ system has never been reported on literature. BaAl₂O₄ is known to emit a blue colour. When BaAl₂O₄ is doped with rare earth metal such as trivalent europium (Eu³⁺) it is known to emit a red colour. In this study, the CIE also confirmed that the un-doped (host) emits a blue colour. When varying the excitation wavelength for the x = 0.075% or varying the dopant concentration the emission colour shifts from navy blue to the light blue. Our results show the appropriate excitation wavelength to get the highest emission. These results also show the excitation wavelength and dopant concentration together with they are corresponding expected emission colour.

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