# Synthesis and characterization of $ZnAl_2O_4$ and $MgAl_2O_4$ doped and co-doped nano-phosphors.

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Many researchers have studied the luminescence behaviour of the rare earths and transition metals in various hosts and most of these studies focus more on the well-known luminescent dopants such as $Mn^{2+}$, $Eu^{2+}$, $Tb^{3+}$, $Er^{3+}$, $Yb^{3+}$ and so on. However, there are scarce reports on the sol-gel synthesis of $ZnAl_2O_4$ and $MgAl_2O_4$ doped and co-doped with non-popular dopants such as $Pb^{2+}$ ions in literature to date (our recent published results are shown in figure 1).

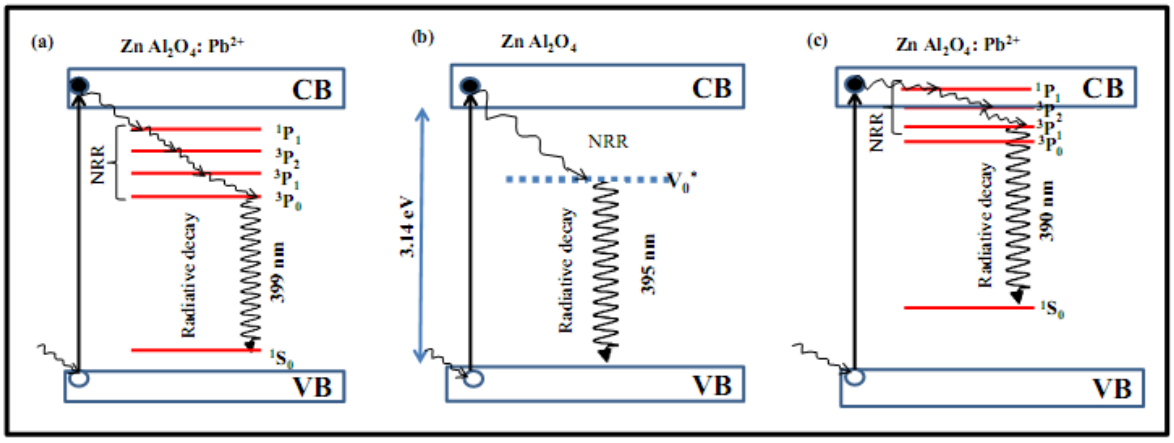


**Figure 1.** Energy levels diagram mechanism for the (a) $ZnAl_2O_4$: $Pb^{2+}$ emission at 399 nm, (b) undoped $ZnAl_2O_4$ emission at 395 nm and (c) $ZnAl_2O_4$: $Pb^{2+}$ emission at 390 nm.

As far as the sol-gel technique is concern, one of the fundamental ingredients during synthesis is a catalyst. Catalytic experiments are well known to produce the products at the lower activation energy compared to the non-catalytic reactions. Catalysis plays a prominent role in the chemical industry and societies. For example, the majority of chemicals and fuels produced in the chemical industry have been produced using one or more catalysts. Without any doubt, it is therefore clear that catalysis plays a prominent role in society today and will be a critical technology for advancing our life. On the other hand, researchers in the green and sustainable chemistry are focusing on the development of economic and eco-friendly methodologies that are free from the use of any catalyst, reagent, promoter or surfactant in aqueous media. Accordingly and amongst others, this study is devoted to investigate the effects of doping non-popular atoms into the $ZnAl_2O_4$ and $MgAl_2O_4$ matrix and the effects of catalyst content during the synthesis of these phosphor materials. This research work is expected to contribute in the research and development of new phosphor materials, white light emitting devices and for the possible applications in green energy technology.