Presentation title: Structure and optical properties characterization on alkaline-earth elements substituted strontium aluminate prepared by wet chemical process

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Abstract (250-300 words):

Alkaline-earth aluminates are the excellent hosts utilized as light storage materials after doping with europium (Eu) and dysprosium (Dy). When different alkaline-earth element is in aluminate structure, it will emit visible light with various wavelength after optical energy source excitation. However, the photoluminescence (PL) intensity and long afterglow (LAG) properties depend on the phase structures and microstructures significantly. The wet chemical process named as modified Pechini-sol gel (PSG) method and solid-state mixed oxide method were used to prepare calcium and magnesium substituted strontium aluminate. The nitrates were dissolved into aqueous solution, then added citric acid ($C_6H_8O_7$) with mole ratio of metallic nitrate to citric acid as 1 to 2. Here, the citric acid acted as a chelating agent. Such an aqueous mixture in a beaker with a magnetic stirrer was put on a hot plate heating at 200°C for 2 hours until the mixture solution dried and became a loose foam. The dried foam was then ground and put in an electric furnace to calcine at different temperatures of 900-1100°C for 6 hours, respectively, in order to obtain the necessary phase. The higher temperatures of 1200-1400°C in reduction atmosphere were used to complete the PL and LAG properties. It was found that the PSG method could synthesize pure phase of aluminates at lower temperature but solid-state method obtained the pure phases difficultly even at high preparation temperature. Furthermore, the PSG method prepared aluminates exhibited higher PL intensity and better LAG than solid-state prepared ones. The blue (440 nm), green (520 nm) and red (618 nm) emission spectra were achieved in our study and widened emission bands could be obtained by mixed alkaline-earth elements substitution.

Biography (150-200 words):

Professor Horng-Yi Chang has experienced as a department Manager in EMTAC Technology Corp. (Hsinchu Science Park) and a principal researcher in the Industrial Technology Research Institute (ITRI), Taiwan. Now, he is a professor of the Department of Marine Engineering, National Taiwan Ocean University, Taiwan. Professor Chang is also the director of Taiwan Association for Hydrogen Energy and Fuel Cell (THEFC), director of the China Marine Institute and alternate director of the

Taiwan Ceramic Society.

In the past years, Professor Chang engaged in studying piezoelectric materials, microwave sintering and microwave dielectric materials, core-shell structural materials and laser annealing process as well as nano-particles treatment. Recently, his research concentrates on energy materials about solid oxide fuel cells/solid oxide electrolyzer cells (SOFC/SOEC), photosensitive solar cells and luminescent energy conversion by use of chemical processes such as hydro/solvo-thermal, sol-gel, core-shell, precipitation and microwave techniques to synthesize, improve and enhance those materials' properties for industrial applications.