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Application-oriented Investigations on Luminescent Nano-composite Glass Ceramics

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Transparent glass ceramic doped with active rare-earth ions is an advanced composite material composed of a glassy matrix and the precipitated nanocrystals incorporated with active ions. This material is expected to integrate the advantages of optical features from the nanocrystals and mechanical and chemical properties from the oxide glass. In this decade, such novel optical materials with excellent frequency conversion characteristics, i.e., up-conversion, quantum cutting down-conversion or down-shift emissions, had attracted increasing scientific interests in the field of functional materials, stimulated by their wide potential applications in the industry areas of light emitting diode (LED), photovoltaic solar cell, three dimensional display, as well as solid state laser. In recent years, my group is dedicated in systematic investigations of the property-directed design, synthesis, structure modification and frequency conversion performance as well as the related potential applications of a series of rare-earth doped inorganic composite glass ceramics, placing extra emphases mainly on searching the routes to achieve high luminescent quantum efficiencies, revealing the physical mechanisms dominating optical performances and establishing structure-property relationships of the composite materials. This presentation introduces some of our main progresses achieved in these aspects and discusses several prospective applications of the newly developed glass ceramic materials.

Biography:

Yuansheng Wang received his B.S. degree (1982) from University of Science and Technology of China (USTC), M.S. degree (1985) from Institute of Solid State Physics, Chinese Academy of Sciences (CAS) and Ph.D (1989) in Condensed Matter Physics from USTC. He was appointed the position of Professor of Chemistry in Fuzhou University, China in 1999. He has joined Fujian Institute of Research on the Structure of Matter (FJIRSM), CAS as a Professor since 2002, leading a group conducting researches on optoelectronic nanomaterials. He has published over 160 academic papers in the mainstream international SCI journals and received more than 6000 citations, with the h-index of 44.