

Photoluminescent red green and blue monoliths of new Eu(III), Tb(III) and Y(III) complexes embedded in silica matrix

Corneliu S. Stan*, Marcel Popa, Daniel Sutiman, Petronela Horlescu

Faculty of Chemical Engineering and Environmental Protection, Gh. Asachi Technical University of Iasi,
73 D. Mangeron, 700050, Iasi, Romania

Abstract: Large transparent photoluminescent monoliths were obtained by introduction of new investigated Eu(III), Tb(III) and Y(III) complexes with 2-(1H-1,2,4-Triazol-3-yl)pyridine, as ligand, in silica matrices through a slightly modified sol-gel process. The remarkable luminescent properties of the free complexes were preserved in the silica matrix, resulting red green and blue monoliths whose shape and dimensions could be altered during the gelation process according to potential applications requirements. Prior to embedment, the complexes prepared at 1/3 metal to ligand ratio were investigated through elemental analysis, thermal analysis, FT-IR, mass and fluorescence spectroscopy while the obtained silica monoliths were supplementary investigated through SEM and fluorescence spectroscopy. The emission peaks are conveniently located at 612 nm for the monolithic silica embedded Eu(III) complex, 542 nm for the monolithic silica embedded Tb(III) complex and 482 nm for the silica monolith containing the Y(III) complex. Their excellent photoluminescent properties may recommend them as photonic conversion materials in various applications in optoelectronics.