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Er이 도핑된 졸-겔 코팅막의 발광특성
Near IR Luminescence Properties of Er-doped Sol-Gel Films

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In fiber optic networks, system size and cost can be significantly reduced by development of optical components through planar optical waveguides. One important step to realize the compact optical devices is to develop planar optical amplifier to compensate the losses in splitter or other components. Planar amplifier provides optical gain in devices less than tens of centimeters long, as opposed to fiber amplifiers with lengths of typically tens of meters. To achieve the same amount of gain between the planar and fiber optical amplifier, much higher Er doping levels responsible for the gain than in the fiber amplifier are required due to the reduced path length. These doping must be done without the loss of homogeniety to minimize Er ion-ion interactions which reduce gain by co-operative upconversion. Sol-gel process has become a feasible method to allow the incorporation of Er ion concentrations higher than conventional glass melting methods. In this work, Er-doped SiO_2-Al_2O_3 films were prepared by two different method via sol-gel process. Tetraethylorthosilicate(TEOS)/aluminum secondary butoxide[$Al(OC_4H_9)_3$], methacryloxypropyltrimethoxysilane(MPTS)/aluminum secondary butoxide[$Al(OC_4H_9)_3$] systems were used as starting materials for hosting Er ions. Er-doped SiO_2-Al_2O_3 films obtained after heat-treating, coatings on Si substrate were characterized by X-ray diffraction, FT-IR, and N-IR fluorescence spectroscopy. The luminescence properties for two different processing procedure will be compared and discussed from peak intensity and life time.