

ALUMINA NANOPOWDER AND EUROPIUM Co-DOPED SILICA OPTICAL FIBERS

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Rare-earth doped optical fibers are important for telecommunications, where they are used in fiber lasers and fiber amplifiers. In our previous work¹ we demonstrated that doping optical fibers with nanopowders of aluminium and erbium oxides can improve their performance. While the doping of fibers with erbium is suitable for use in telecommunications because of its emission at approx. 1550 nm, the doping of fibers with europium and measurement of its emission spectra in visible range provides information about europium ions local environment, i.e. crystallinity of the fiber cores and it can help us to optimize parameters for preparation of other rare-earth doped fibers.

Two types of silica-based preforms co-doped with aluminium and europium were prepared by the methods described before¹. One type of preforms was prepared using solution of aluminium chloride while the other type was prepared using dispersion of alumina nanopowder. A solution of europium chloride was used for doping of preforms by europium.

In this work, we will present a comparison of “conventionally” and “nanoparticle” doped optical fibers and preforms using fluorescence emission spectra, AFM analysis and confocal microscopy.

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References:

- [1] Podrazky O., Kasik I., Pospisilova M., Matejec M.: Use of nanoparticles for preparation of rare-earth doped silica fibers, *Phys. Status Solidi A* (Proceedings of TNT 2008 "Trends in Nanotechnology"), accepted for publishing in 2009.