Dy^{3+}-doped phosphate glass optical fibers for 577 nm wavelength fiber lasers (Conference Presentation)

Diego Pugliese,[1] Martha Segura,[2] Nadia Giovanna Boetti,[3] Joris Lousteau,[4] Guido Perrone,[1] Davide Janner,[1] Sami Slimi,[2] Pavel A. Loiko,[5] Mailyn Ceballos,[2] Xavier Mateos[2]

[1]*Politecnico di Torino (Italy)*

[2]*Univ. Rovira i Virgili (Spain)*

[3]*LINKS Foundation (Italy)*

[4]*Politecnico di Milano (Italy)*

[5]*Univ. de Caen Normandie (France)*

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Abstract

Lasers emitting in the visible find applications in biology and medicine. Considering the success of near-infrared fiber lasers, the possibility to optically pump rare-earth-doped fibers in the blue to directly obtain visible emission is attractive. The recent progress in the field of GaN-based blue laser diodes offers new scopes. Dy^{3+}-doped materials have received much interest because of their intense yellow emission originating from the $^4F_{9/2}\rightarrow{}^6H_{13/2}$ transition. An involvement of a glass matrix benefiting from enhanced thermo-mechanical properties would ease diode pumping. We report on the synthesis of a series of novel phosphate glasses in the system P_2O_5-Al_2O_3–BaO-K_2O doped with Dy_2O_3. The Dy^{3+} concentrations were 0.05, 0.21, 0.83 and 2.5 [10^{20} ions/cm^3]. The glasses were synthesized by the standard melt-quenching technique and thoroughly characterized in their physical, thermo-mechanical and optical properties. A Dy^{3+}-doped optical fiber was drawn by preform drawing from the developed glasses, with the preform being obtained by rod-in tube technique, combining a cast core and an extruded cladding. Preliminary emission results in the visible from the fabricated fiber will be reported.