

New erbium-doped photonic materials

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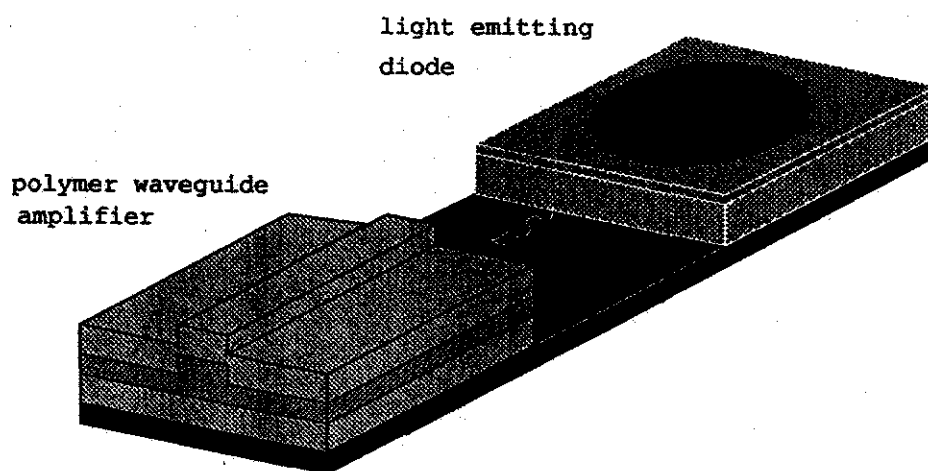
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Abstract

Erbium-doped organic complexes are synthesized and show room temperature photoluminescence at 1.54 μm . The luminescence lifetimes, and temperature quenching are studied for complexes with different structures, and complexes in which specific H atoms are replaced by D atoms. Coupling of the Er^{3+} with nearby C-H and O-H bonds causes quenching of the luminescence. These erbium-doped organic complexes may be used in planar optical waveguide amplifiers operating at 1.54 μm .

Hydrogenated amorphous silicon films, deposited by plasma enhanced chemical vapour deposition are implanted with erbium ions. The 1.54 μm photoluminescence and the effect of post implantation annealing and O co-doping are studied. Erbium implanted p-i-n diodes show room temperature electroluminescence at 1.54 μm under forward bias.



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