# Reversible emission switch: luminescent elpasolite matrix as new generation of opto-thermo chemical sensor.

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**Highlights**

Reversible luminescence, optical sensor, redox phenomenon.

**Abstract**

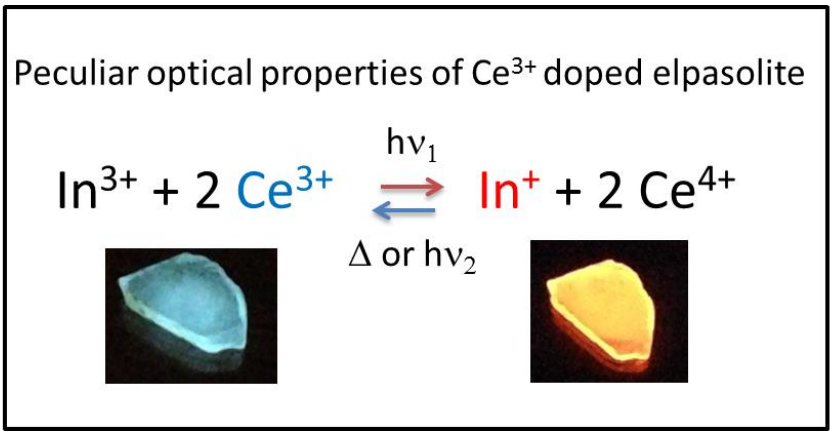


Figure 1: Reversible optical switch observed under UV irradiation

Development of selective and specific sensor has been attracted considerable attention for a decade. Optical sensing systems are compatible with distance testing keeping the excitation and detection system out of the sensing zone. They are suited to the on-board technologies and multiple light sources and detectors are now available for the obtaining of compact and robust systems. To detect an event means that a significant change of the optical properties has to occur.
We focus this work on an interesting luminescent material that presents a reversible redox phenomenon under irradiation or temperature. The ignition and the extinction of the blue and red emission are related to the oxidation and reduction processes between trivalent cerium and indium ions under UV irradiation (figure 1). Single crystals were grown using the Bridgman technic. The irradiated crystal zones are stable during at least a decade if not irradiated or heated. Understanding of these specific luminescence data [1] will be exposed and supported by structural and chemical characterizations as well as DFT calculations. The concentration dependence of luminescence properties will be shown. Finally cycling of these materials will illustrate their capability to be used as optical sensors.

**Acknowledgement**

The authors thank the Université de Bordeaux, the CNRS, the Région d'Aquitaine and the French National Agency of Investigation ANR (contract n° ANR-2010-BLAN-0820) for financial support.

**References**

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