

**Presenting Author: M.C. Pujol**

**E-mail: pujol@urv.net**

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## **KRE(WO<sub>4</sub>)<sub>2</sub> (RE=Gd,Yb) Nanocrystals: Synthesis and characterisation.**

M. Galceran, M.C. Pujol, M. Aguiló and F. Díaz

*Física i Cristal·lografia de Materials (FiCMA). Universitat Rovira i Virgili. Campus Sescelades C/Marcel·lí Domingo, S/N, 43007-Tarragona, Spain*

KRE(WO<sub>4</sub>)<sub>2</sub> (RE= Gd and Yb) transparent nanocrystalline powder have been obtained by the modified Sol-Gel Pechini Method. KREW (RE= Gd, Y, Yb and Lu) have been reported in the bibliography of the last years as a interesting and promising solid state laser materials [1]. Laser action in ytterbium doped tungstates has been efficiently achieved, currently conforms an interesting alternative to Nd:YAG applications and it is already the active laser crystal in a commercial laser [2].

In 1967, Pechini [3] developed a three-stage process for the preparation of the precursor polymeric resin, first, a mixture of cations is formed in an organic complexing agent (citric acid or EDTA) and ethylene glycol solution; secondly the cations become a chelate. Third, the polymeric resin forms and the decomposition of this polymer happens at 523 K. The precursor resin powder for KREW has been calcinated at the range of temperatures between 873-973 K during maximum of 5 h. in order to obtain KREW nanocrystals in the range of 20-200 nm. Up to our knowledge, KREW tungstates have been not prepared as nanocrystals till now.

X-Ray powder analysis and differential thermal analysis (DTA) have been used to study the transformation from amorphous powder into a crystalline monoclinic phase. Scherrer formula has been used to confirm the grain sizes that were visualised by SEM and TEM. Figure 1 shows the aspect of the nanocrystals.

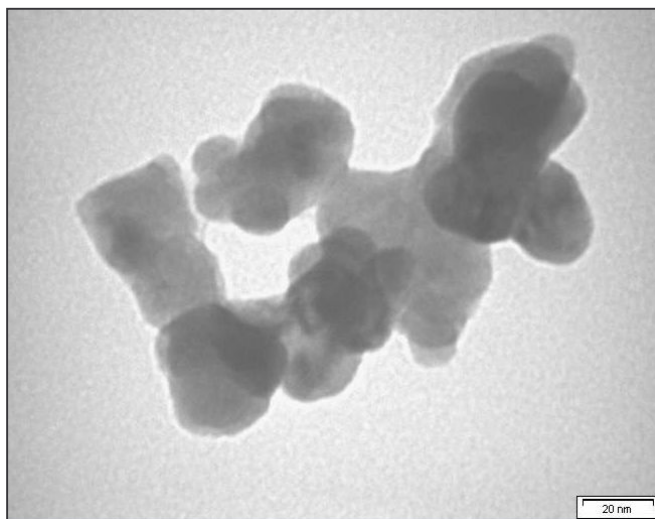


Figure 1 . TEM photograph of KREW nanocrystals.

- 1) A.A. Kaminskii, Crystalline Lasers, Physical Processes and Operating Schemes, Laser and Optical Science and Technology Series, CRC, Boca Raton, 1996.
- 2) A. Krueger, P. Ferú. Photonics Spectra March **2004**. <http://www.photonics.com>.
- 3) M. P.Pechini , US Patent No.3.330.697,July 11, **1967**.