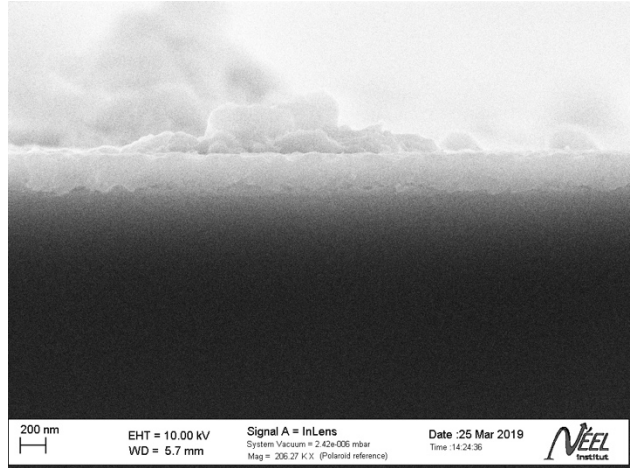


Elaboration of epitaxial Rubidium Titanyl Phosphate (RTP) thin films by Pulsed Laser Deposition (PLD)

General Scope:

Potassium titanil phosphate (KTiOPO_4 , KTP) is a nonlinear optical crystal that is used commercially for second harmonic generation (SHG) of the $1.064 \mu\text{m}$ Nd:YAG laser for example. Most of its applications are based on bulk KTP crystals. Nevertheless, it was reported [1] that a type-II second-harmonic generation and sum-frequency mixing could be realized in uniform epitaxial RbTiOPO_4 (RTP) films over KTP channel waveguides prepared by Pulsed Laser Deposition (PLD). Such waveguides could open the way to efficient low energy nonlinear optical devices for numerous applications in particular in optical Telecom.



[1] Liu *et al.*, *J. Appl. Phys.* 76 (12)

Research topic and facilities available:

RTP single crystals are already grown at the lab by flux method. These massive single crystals will be used as target in a low vacuum chamber in order to deposit thin films by Pulsed Laser Deposition (PLD). The deposition conditions will be optimized to ensure the formation of the right phase, as well as a high crystal quality.

The obtained films will be characterized by X-ray Diffraction (powder and at grazing angle, both available at the Institut Néel), as well as by Scanning Electron Microscopy. The epitaxy quality will be monitored by texture measurements including XRD and EBSD as well as transmission electron microscopy. According to the film quality, SHG will be studied at the Institut Néel.

Possible extension as a PhD:

Yes if funding

Required skills:

Good skills in Materials Sciences (Deposition techniques, vacuum knowledges, characterization techniques: XRD, SEM)

Good writing and oral skills

Starting date: February-March 2022

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