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## **Studies of thin film with NEPOMUC apparatuses: free volume and gas transport properties in biopolymers, defects in SiO<sub>2</sub>, UO<sub>2</sub>, ZnO oxides.**

*Tuesday 10 December 2019 15:15 (25 minutes)*

I will review recent studies done thanks complementary and basic measurements carried out with NEPOMUC apparatuses. Depth resolved measurements with Positron annihilation lifetime spectroscopy (PALS), Doppler broadening spectroscopy (DBS) and coincidence Doppler broadening spectroscopy (CDBS) were performed in thin films.

Transport properties of light gas molecules were measured in biopolymer nanocomposite by gas permeation employing mass spectroscopy technique; gas barrier or sieve effects of cellulose nanofibrils, PHBH with dispersed graphene and PLA with dispersed cellulose were explained through the knowledge of the free volume structure as revealed by PALS.

Defects induced by Ar and O ion implantation in ZnO were characterized by DBS and CDBS. Vacancy clusters formation and evolution in UO<sub>2</sub> as a function of annealing temperature and film deposition condition will be presented at the light of PALS, DBS and CDBS measurements; CDBS measurements were also compared with recent ab initio calculations.

Possible future experiments with improved apparatuses at NEPOMUC will be discussed.

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