Contribution ID: **1093** Type: **Poster**

Radiation- and photo-chemical synthesis of nanocrystalline scintillators at CTU in Prague

Thursday, 19 May 2022 18:11 (20 minutes)

Radiation- and photo-chemical synthesis is a promising tool for large-scale preparation of nanocrystalline powder scintillators. Our studies to date include many scintillating material groups: simple oxides (Al2O3, ZnO, ZrO2, HfO2) or multicomponent oxides, namely garnets (YAG, LuAG, GGAG, etc.). Photochemical method also allows the preparation of non-oxidic materials, for example sulfides (ZnS, (Zn,Cd)S...).
The synthesis is based on radiation- or photo-induced precipitation of solid precursors from aqueous solutions containing formate anions and soluble metal salts (nitrates or chlorides). Gamma radiation, electron beam or UV radiation sources were used for the irradiation of solutions. Solid precursors were subsequently separated from aqueous phase and heat treated to obtain the final products. In some cases, the final product was obtained directly after irradiation (for example, ZnO or ZnS).
Structural, morphological, luminescence and scintillation characteristics were studied in detail. Prepared materials feature high chemical and phase purity, good crystallinity and intense radioluminescence emission. Results indicate that the prepared nanomaterials may be prospectively utilized as highly efficient scintillators either for the preparation of optical ceramics, or as ultrafast scintillators for a next generation of detectors.

Primary authors: PROUZOVÁ PROCHÁZKOVÁ, Lenka (Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague); BÁRTA, Jan (Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering); ČUBA, Václav (CTU in Prague - FNSPE, Department of Nuclear Chemistry)

Presenter: PROUZOVÁ PROCHÁZKOVÁ, Lenka (Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague)

Session Classification: Radiation Chemistry

Track Classification: Radiation Chemistry