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Crystal growth and scintillation properties of ag doped sodium chloride single crystal for radio photoluminescence dosimetry JAEYOUNG CHO, ARSHAD KHAN, HYEOUNGWOO PARK, HONGJOO KIM, Kyungpook Natl Univ — The commonly used silver doped phosphate glass dosimeter is based on the principle of radio photoluminescence (RPL). The exposure of ionizing radiations creates color centers related to the Ag ions in the Ag-doped phosphate glass which emits fluorescence when excited by UV light. The excited electrons generated from the color centers return to the original color centers after emitting the fluorescence. This process is called RPL phenomena. RPL has been studied widely for various composition such as silver-activated glass and silver-activated alkali halides single crystals [1-2], for dosimetry applications. Because of the better performance of single crystal than glass dosimeters, silver doped sodium chloride (NaCl:Ag) single crystal with different concentration were grown by using the two zones vertical Bridgman technique. Scintillation and luminescence properties such as light yield, response time and emission wavelength are measured under X- and gamma-ray excitation at room temperature. Based on these measured properties the Ag doping concentration was optimized in NaCl single crystal. The optimized NaCl:Ag single crystal was evaluated for the RPL dosimetry applications. We also studied RPL mechanism of the crystal and compared with RPL glass. Single crystal growth, lumincsence, scintillation and RPL properties of NaCl:Ag will be presented in this work.

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