

Performance of LYSO and BC420 Coupled with Ketek and Sensl SiPM for Needs of PALS

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Abstract. Material research of structural steels used in extreme conditions is important for the safe and reliable operation of individual components of nuclear installations. One of the effective methods of examining their microstructure is positron annihilation lifetime spectroscopy (PALS). For the needs of PALS, new types of detectors are currently being used compared to conventional photomultipliers. These types of detectors, however, are not sensitive to fast ultraviolet component of emission spectrum of the most commonly used scintillation material in this sphere - barium fluoride. This paper analyses the effect of the usage of LYSO and plastic scintillators on the properties of the spectrometric apparatus. These scintillation materials were linked to the SiPM detectors Sensl MicroFJ-SMA-300 and Ketek PE6650-EB-AX as well as to the conventional Photonis XP2020Q photomultiplier.