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An ultra-low radioactivity measurement HPGe facility at the Center for Underground Physics

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The Center for Underground Physics (CUP) at Institute for Basics Science (IBS) has been conducting and preparing a few ultra-low background rare decay experiments at the Yangyang underground laboratory (Y2L). In order to keep the background levels in the experiments low enough, it is critical to screen raw materials or detector components to be used in the detectors. For the screening, a number of ultra-low radioactivity detectors are developed and installed. Among the detectors installed, we have a number of HPGe (High Purity Germanium) detectors in the Y2L for measurements of gammas from the background nuclei. Two of 100% p type coaxial single HPGe detectors were installed and have been running from 2016 for the measurement of samples with close to 100% running time. In addition, an array of 14 HPGe detectors was installed in 2017 spring after screening the array detector materials with the single HPGe detectors for an efficient measurement of gamma rays from samples with bigger volumes. Various scintillation crystals such as CaMoO4, Li2MoO4, and NaI(Tl) have been grown with purified raw materials and tested for their radioactivity background levels. In this contribution, a summary of their developments and performances will be presented.

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