Above-ground measurements of CaMoO4 crystal detectors using metallic magnetic calorimeters

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The AMoRE (Advanced Mo based Rare process Experiment) project is an international experiment to search for neutrinoless double beta decay of ^{100}Mo using scintillating crystals at low temperatures. We use metallic magnetic calorimeters (MMCs) for the simultaneous measurement of heat and scintillation light signals caused by particle interactions in the crystal. A 200-g $^{40}Ca^{100}MoO_4$ crystal (enriched in ^{100}Mo and depleted in ^{48}Ca) detector was tested at milli-Kelvin temperatures in an above-ground laboratory with aims to investigate the detector performances and to estimate the internal radioactive contamination of the crystal. A 9-keV FWHM energy resolution for the 2.6-MeV gamma-ray full absorption peak was obtained with a ^{232}Th calibration source. Pulse shape discrimination shows a 17 σ discrimination power of α and β induced events in the 4-6 MeV region. Activities of radionuclides in the crystal were estimated from the energy spectrum of α induced events. Energy calibration, energy threshold, and rejection power of randomly coinciding background events of the detector will also be presented.