Development of CdWO\textsubscript{4} Crystal Detectors\textsuperscript{1} ALYSSA DAY, University of South Dakota — CdWO\textsubscript{4} scintillators have been proposed for detecting geo-neutrinos, neutrinoless double-beta decay, and dark matter. Initial research involved an energy resolution comparison of three different sized gamma ray detecting CdWO\textsubscript{4} crystals. The three crystals had diameters of 16mm and thicknesses of 5mm, 9mm, and 19mm, respectively. When using the 19mm CdWO\textsubscript{4} crystal, the energy resolution of a $^{137}$Cs source resulted in 11.4\% at 662 keV. A $^{60}$Co source used with the same crystal resulted in 6.5\% at 1173.2 keV and 8.6\% at 1332.5 keV. As the sizes of the crystal decreased, a slight deterioration in energy resolution occurred with more Compton scattering in the energy spectrum. The CdWO\textsubscript{4} crystal was beneficial when measuring gamma-ray energy close to 511 keV, which is the primary signature for geo-neutrino detection with $^{106}$Cd. By initially using a number of smaller crystals, small scale experiments can be run to develop and understand the calibration of these crystals. Current experiments involve using a 2 inch CdWO\textsubscript{4} crystal. It is predicted that with the use of this larger crystal, energy resolution and detection will improve. The results of this experiment will be presented.

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