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Measurement of heat capacity of yttrium silicide (Y5Si3) in the ultra-low temperature range

Most chemical processes to extract the Ho-163 isotope and insert it into a detector absorber involve yttrium based compounds. Rather than using yttrium as an intermediate step in the isotope extraction procedure, the metal yttrium silicide (Y5Si3) was a possible candidate to use directly as absorber material. We measured the heat capacity of small Yttrium Silicide (Y5Si3) sample in the temperature range 90mK -300mK using bolometric technique, to confirm if it could be used as an absorber in the fabrication of microcalorimeters. We also measured its resistivity from room temperature to 90 mK four wire measurement technique. Our result indicated that the heat capacity of Y5Si3 is larger than gold (often used as absorber material) by more than a factor of five in the working temperature range of TES microcalorimeters.

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