SEEBECK COEFFICIENT OF $CePd_3$

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A brief review is provide of thermoelectric devices and materials. Most metals have a small Seebeck coefficient and are unsuitable for thermoelectric devices. The exceptions are metals with a localized magnetic moment, such as provided by a rare-earth ion. There are many rare-earth compounds which contain either cerium or ytterbium which attain Seebeck coefficients in the range of $50 - 100$ $\mu V/K$. The highest reported value is found in $CePd_3$ which attains a value of 125 $\mu V/K$ with doping. Here we wish to explain the reason behind this larger value. Although the difference between 100 and 125 seems small, the larger value represents a breakthrough. The value of 100 $\mu V/K$ appeared to be a universal maximum, so that 125 represents an achievement. A value of only 160 $\mu V/K$ would make a material useful in thermoelectric devices. The high value in $CePd_3$ is explained as a result of the placement of the cerium f–levels.

9.7 cm

13.4 cm

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