

## 21.4: The Debye Function is Used to Calculate the Heat Capacity at Low Temperatures

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The Debye function has been experimentally determined to calculate the heat capacity at low temperatures, between 0 K and 15 K, for nonmetallic crystals:

$$\bar{C}_P = aT^3$$

Constant  $a$  can be found by ensuring  $\bar{C}_P$  is continuous up to lowest  $\bar{C}_P$  data point. The Debye function is named after the Dutch chemistry Peter Debye, who theoretically showed this relationship. Metallic crystals have a slightly different equation at low temperature:

$$\bar{C}_P = aT + bT^3$$

where  $a$  and  $b$  are constants.

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