Assume you use calorimetry to calculate the specific heat capacity of a 125.24 g piece of unknown metal. You intially heat the metal to 100.0 °C in boiling water. You then drop the chunk of metal into a calorimeter containing 47.22 g of water at 19.7 °C. After closing and stiring the calorimeter thoroughly, the metal and water both come to equilibrium at a temperature of 27.6 °C.

**Part A**

What is the temperature change of the water?

Top of Form

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | 100.0 °C | |  | 19.7 °C | |  | 7.9 °C | |  |  |

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[submit](javascript:submitSolution('14',document.form_id2512018.answer_id4066334))http://session.masteringchemistry.com/assets/images/pix.gifhttp://session.masteringchemistry.com/assets/images/myanswers_grey.gif[show answer](javascript:requestSolution('14'))http://session.masteringchemistry.com/assets/images/reviewpart_grey.gif

**Part B**

What is the temperature change of the metal?

Top of Form

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | -72.4 °C | |  | 125.2 °C | |  | -27.6 °C | |  |  |

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**Part C**

How much heat was gained by the water? (calculate the qwater)

Top of Form

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | 33.1 J | |  | 1561 J | |  | 418.4 J | |  |  |

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**Part D**

Knowing the above, what must qmetal?

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | -33.1 J | |  | -1561 J | |  | -125240 J | |  |  |

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**Part E**

Then what must the the Specific Heat of the metal be?

Top of Form

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | 0.4184 J/g°C | |  | 25.00 J/g°C | |  | 0.1721 J/g°C | |  |  |

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