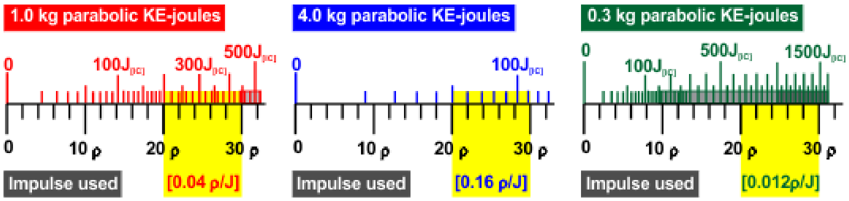


How Calories Create Molecular Energy

Professor Du-Ane Du

www.Wacky1301SCI.com, *"Looking at serious science, sideways!"*

Three sisters, Pico, Hectii, and Tera, the "Space-sci Sherlocks," are traveling through the Asteroid Belt. They spend some time at the Gravity Spa, and perform experiments involving calories and the creation of molecular/atomic kinetic energy.
—Excerpted from *Murdered Energy Mysteries*, Part 3, Chapter 3, by Du-Ane Du, (Amazon, Kindle, ebook 2018, paperback 2021).

TO: Grandma Aaret,

FROM: Pico

Hi Grandma, Tera said I could write today.

We had a great visit with Grandpa Proge the other day. And today Hectii showed me how calories work.

A calorie is the measure of the amount of heat that water absorbs as it gets hotter. But calories don't seem to have anything to do with kinetic energy—at least so far.

Let me explain, we did a neat experiment in the teeter-totter fluctuating-gravity room. We used a computer simulator that showed us the temperature changes when we mixed two noble gasses together, or one solid substance with a noble gas.

After several experiments, Hectii suggested we do an experiment involving moles of our test substances. I haven't taken chemistry yet, so I don't know what a mole is. I'll have to admit that using moles seemed simple—but it didn't affect our results much.

For example, if we heat a 0.011 kg block of beryllium-11 (1.0 mol) to a temperature of 150°C, and we put it into a container holding 0.084 kg of krypton-84 (1.0 mol) at a temperature of 25°C, the temperature of the beryllium-11 will go down, and the temperature of the krypton-84 will go up. How much? The simulator we used showed, if we keep the volume constant, and allow the pressure to change, the temperature will stabilize at 101.68°C.

Now we want to double check the "law of conservation of calories." To do that, we calculate the number of calories of heat that the beryllium lost and the krypton gained.

First let's look at the beryllium-11. The specific heat of beryllium-11 is about 0.437 4 cal/g/°C. The calculations for calories lost look like this (I'm rounding off some numbers.):

$$\Delta\, heat_{Be} = (mass)(temp\ change)(specific\ heat)$$

$$\Delta\, heat_{Be} = (11\ g)(101.68°C - 150°C)(0.437\ 4\ \frac{cal}{g°C})$$

$$\Delta\, heat_{Be} = 232.5\ cal\ lost$$

What about the krypton? When krypton-84 is kept at a constant volume, it has a specific heat of around 0.036 09 cal/g/°C**.** The calculations for heat-calories gained by the krypton-84 atoms are:

$$\Delta\, heat_{Kr} = (mass)(temp\ change)(specific\ heat)$$

$$\Delta\, heat_{Kr} = (84\ g)(101.68°C - 25°C)(0.036\ 09\ \frac{cal}{g°C})$$

$$\Delta\, heat_{Kr} = 232.5\ cal\ gained$$

ISN'T THAT AWESOME, Grandma!! One loses heat-calories, one gains heat-calories, and the amount of gain and loss of heat-calories is always the same. That's what Lavoisier's law of conservation of calories was all about. And the

Space-sci Sherlocks have decided to call it our **calorie fact #1 of heat conservation:**

Object A cannot become warmer unless one or more other objects become colder, and the number of heat-calories lost by Object B is always equal to the number of heat-calories gained by Object A. Therefore, calories are a valid method of measuring heat and heat transfer, because in normal situations, heat-calories cannot be created or destroyed.

But are heat-calories the same thing as $\text{joules}_{[IC]}$ of invo-atomic kinetic energy? That's the question we were trying to investigate. The kinetic theory of heat theorizes that, when an object gets hotter, the atoms move faster, and the invo-atomic kinetic energy increases. The kinetic theory of heat claims that an object's temperature is a measure of the kinetic energy contained in the moving molecules.

There is also a theory that 1 calorie is equal to 4.184 $J_{[IC]}$ of invo-atomic kinetic energy. We checked that out too.

Here's what we did. There is an old equation that is supposed to tell us the speed of different types of atoms at different temperatures. Look here, I'll calculate the speed of the beryllium-11 atoms at a starting temperature of 101.68°C, and at a final temperature of 150°C:

$$velocity = \sqrt{\frac{24\,403(\text{Temp} + 273.15)}{mass\ in\ amu}}$$

$$v = \sqrt{\frac{24\,403(℃ + 273.15)}{m_{amu}}}$$

$$v_{Be\ 101.68℃} = \sqrt{\frac{24\,403(101.68℃ + 273.15)}{11_{amu}}}$$

$$\boldsymbol{v_{Be\ 101.68℃} = 911.9\ m/s}$$

And:

$$v = \sqrt{\frac{24\,403(℃ + 273.15)}{m_{amu}}}$$

$$v_{Be\ 150℃} = \sqrt{\frac{24\,403(150℃ + 273.15)}{11_{amu}}}$$

$$\boldsymbol{v_{Be\ 150℃} = 968.9\ m/s}$$

I can do the same thing to calculate the speed of the krypton-84 atoms at a starting temperature of 101.68°C, and a final temperature of 25°C. Here's what those calculations look like:

$$v = \sqrt{\frac{24\,403(℃ + 273.15)}{m_{amu}}}$$

$$v_{Kr\ 101.68℃} = \sqrt{\frac{24\,403(101.68℃ + 273.15)}{84_{amu}}}$$

$$\boldsymbol{v_{Kr\ 101.68℃} = 329.99\ m/s}$$

And:

$$v = \sqrt{\frac{24\,403(℃ + 273.15)}{m_{amu}}}$$

$$v_{Kr\ 25℃} = \sqrt{\frac{24\,403(25℃ + 273.15)}{84_{amu}}}$$

$$\boldsymbol{v_{Kr\ 25℃} = 294.3\ m/s}$$

X-plosive, no? It's all so simple. Now I know the starting and ending velocities of the beryllium-11 atoms, and that means I can calculate the amount of kinetic energy that the atoms of beryllium-11 allegedly lost as it cooled off. It's easy, because I can use the same kinetic energy equation we've used in the past. It looks like this:

$$\Delta KE = (im\Delta\rho)(speedy)$$
$$\Delta KE = (mv_f - mv_i)\left(\frac{v_{final} + v_{initial}}{2}\right)$$
$$\boldsymbol{\Delta KE = \frac{1}{2}mv_{final}^2 - \frac{1}{2}mv_{initial}^2}$$
$$\Delta KE_{Be} = \frac{1}{2}(0.011kg)(968.8)_f^2 - \frac{1}{2}(0.011kg)(911.9)_i^2$$
$$\Delta KE_{Be} = \sim 4\,573.52\ joules - \sim 3\,637.88\ joules$$
$$\boldsymbol{\Delta KE_{Beryllium} = 589.6\ J_{[0.001\ 06]}\ lost}$$

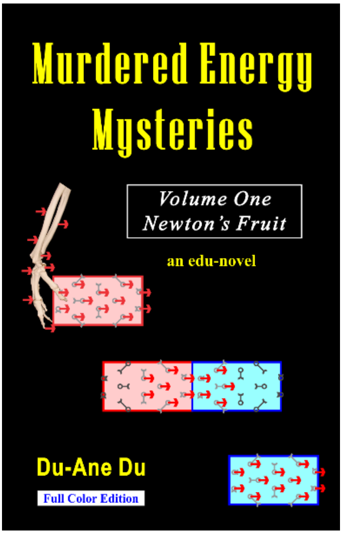
And we can do the same thing for the krypton-84. It looks like this:

$$\boldsymbol{\Delta KE = \frac{1}{2}mv_{final}^2 - \frac{1}{2}mv_{initial}^2}$$
$$\Delta KE_{Kr} = \frac{1}{2}(0.084kg)(329.99)_f^2 - \frac{1}{2}(0.084kg)(294.3)_i^2$$
$$\Delta KE_{Kr} = \sim 4\,573.5\ joules - \sim 3\,637.9\ joules$$
$$\boldsymbol{\Delta KE_{Krypton} = 935.6\ J_{[0.003\ 20]}\ gained}$$

The beryllium-11 allegedly lost 589.6 $J_{[0.001\ 06]}$ of molecular kinetic energy, but the krypton-84 allegedly gained 935.6 $J_{[0.003\ 20]}$! Once again, energy has been created!! And that's a clear violation of Newton's law of action-reaction.

[For more examples and explanations, see *Murdered Energy Mysteries*, Part 3, “Mysteries of Murdered Heat Energy”.]

Don’t be shocked, Grandma. Calculations involving kinetic-joules$_{[IC]}$ rarely match. I hope Tera explained this to you, but weeks ago we discovered that light things gain joules$_{[IC]}$ of energy much faster than heavier things, or is it the other way around? Sometimes, I become confused—perhaps it’s because kinetic energy involves multi-parabolic kinetic-joules$_{[IC]}$. In this case, Beryllium-11 atoms are much lighter than krypton-84 atoms, and the velocity changes were very different.



We’re summarizing all this confusing information in something we call the **calorie fact #2 of improbable kinetic/heat-energy:** There is no correlation between the transfer of heat-calories from one object to another and the alleged transfer of kinetic energy. Calculations of kinetic energy involve multi-parabolic kinetic-joules$_{[IC]}$, so when atoms change speed, the amount of energy allegedly generated or destroyed is dependent on the mass and the initial speed of the receiving atoms.

Remember, energy is speed infused impulse. Therefore as they speed up, lighter atoms usually generate kinetic energy faster than heavier atoms, and lighter atoms usually destroy kinetic energy at a faster rate as they slow down. What cannot be measured, probably doesn't exist. Therefore, joules$_{[IC]}$ of kinetic/heat-energy is either a philosophical precept, or it is a component of a spiritual belief system.

Wow, calorie fact #2 of improbable kinetic/heat-energy says a lot! Hectii thinks kinetic/heat-energy is another murdered *energia*-myth. I wonder if she is right?

CONCLUSION: More research needs to be done into the relationship between mechanical energy and other theoretical forms of energy. Many common beliefs may actually be philosophical myths.

Murdered Energy Mysteries seeks to increase understanding of the various forms of momentum and momentum transfer, as well as the various forms of energy and energy transfer. The lack of understanding on the part of the scientific community is substantial, and more research needs to be done.

—Du-Ane Du, author of the edu-novel *Murdered Energy Mysteries* (Amazon, Kindle, e-book 2018, paperback 2021.)

More information, see:
Murdered Energy Mysteries,
an edu-novel

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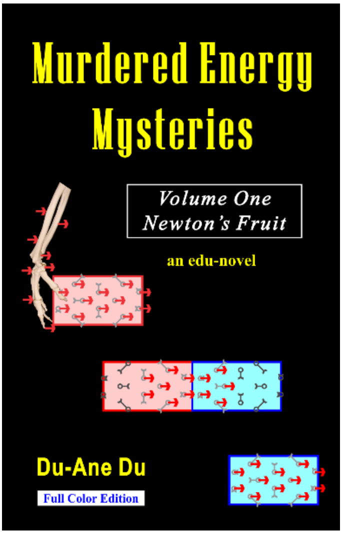

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