

Highlights – *Continued Equality*

Paper 1: Yao, X-W., An, H.* “**State and Equal-intrinsic Energy Curved Surfaces of Ideal Gas**”. *Interdiscip. J. Chem.*, **2017**, 1(2), 66–71. <https://oatext.com/State-and-equal-intrinsic-energy-curved-surfaces-of-ideal-gas.php>

- Ideal gas state curved surface, $PV = nRT$, is a ruled quadric surface.
- Twelve differential equations were obtained through theoretical derivation from various respects
- Curved surface equation of intrinsic energy $U = \frac{\tilde{C}_v}{R} pV = n\tilde{C}_v T$, the *continued equality*, derived herein includes all the basic theories of ideal gas
- Joule’s law has both verifiability and falsifiability. It includes four of the twelve partial differential equations derived from continued equality, but excludes the rest eight.

Paper 2: Yao, X-W., An, H.*, Yang, G.-S., Hou, J.-Q., Niu, T.-S. “**Experimental Validation of the Relationship between Internal Energy and State of Ideal Gas**”, *Interdiscip. J. Chem.*, **2017**, 1(2), 72–80. <https://oatext.com/Experimental-validation-of-the-relationship-between-internal-energy-and-state-of-ideal-gas.php>

- The widely-connected “fact community” and “logic community” with the known facts and the current theories were derived
- The conclusions obtained can be merged with all the current accepted view regarding “phenomenon” and “understanding”
- *The internal energy of the ideal gas has interrelationship with each state function*, and the derived result is mathematically expressed as a *continued equality*:

$$U = \frac{\tilde{C}_v}{R} pV = n\tilde{C}_v T \quad (\lim_{T \rightarrow 0} U = 0)$$

- Inclusive of free expansion and Rossini-Frandsen experiments as well as all current basic theories of the ideal gas, therefore, becoming the new addition to the current thermodynamics and related basic theories