

Erratum: “Nanofluids: Synthesis, Heat Conduction, and Extension” [Journal of Heat Transfer, 2009, 131(3), p. 033102]

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There was a symbol mix-up in Sec. 3. Therefore corrections are needed in the paper, as follows.

1. Page 033102-4: Eqs. (9)–(14), (16), and (18) should read

$$\gamma_{\beta} \frac{\partial \langle T_{\beta} \rangle^{\beta}}{\partial t} = k_{\beta\beta} \Delta \langle T_{\beta} \rangle^{\beta} + k_{\beta\sigma} \Delta \langle T_{\sigma} \rangle^{\sigma} + ha_v (\langle T_{\sigma} \rangle^{\sigma} - \langle T_{\beta} \rangle^{\beta}) \quad (9)$$

$$\gamma_{\sigma} \frac{\partial \langle T_{\sigma} \rangle^{\sigma}}{\partial t} = k_{\sigma\sigma} \Delta \langle T_{\sigma} \rangle^{\sigma} + k_{\sigma\beta} \Delta \langle T_{\beta} \rangle^{\beta} + ha_v (\langle T_{\beta} \rangle^{\beta} - \langle T_{\sigma} \rangle^{\sigma}) \quad (10)$$

$$\begin{bmatrix} \gamma_{\beta} \frac{\partial}{\partial t} - k_{\beta\beta} \Delta + ha_v & -k_{\beta\sigma} \Delta - ha_v \\ -k_{\sigma\beta} \Delta - ha_v & \gamma_{\sigma} \frac{\partial}{\partial t} - k_{\sigma\sigma} \Delta + ha_v \end{bmatrix} \begin{bmatrix} \langle T_{\beta} \rangle^{\beta} \\ \langle T_{\sigma} \rangle^{\sigma} \end{bmatrix} = 0 \quad (11)$$

$$\begin{aligned} & \left[\left(\gamma_{\beta} \frac{\partial}{\partial t} - k_{\beta\beta} \Delta + ha_v \right) \left(\gamma_{\sigma} \frac{\partial}{\partial t} - k_{\sigma\sigma} \Delta + ha_v \right) \right. \\ & \left. - (k_{\beta\sigma} \Delta + ha_v)^2 \right] \langle T_i \rangle^i = 0 \quad (12) \end{aligned}$$

$$\begin{aligned} \frac{\partial \langle T_i \rangle^i}{\partial t} + \tau_q \frac{\partial^2 \langle T_i \rangle^i}{\partial t^2} &= \alpha \Delta \langle T_i \rangle^i + \alpha \tau_T \frac{\partial}{\partial t} (\Delta \langle T_i \rangle^i) \\ &+ \frac{\alpha}{k} \left[F(\mathbf{r}, t) + \tau_q \frac{\partial F(\mathbf{r}, t)}{\partial t} \right] \quad (13) \end{aligned}$$

$$\tau_q = \frac{\gamma_{\beta} \gamma_{\sigma}}{ha_v (\gamma_{\beta} + \gamma_{\sigma})}, \quad \tau_T = \frac{\gamma_{\beta} k_{\sigma\sigma} + \gamma_{\sigma} k_{\beta\beta}}{ha_v (k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma})}$$

$$k = k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma}, \quad \alpha = \frac{k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma}}{\gamma_{\beta} + \gamma_{\sigma}}$$

$$F(\mathbf{r}, t) + \tau_q \frac{\partial F(\mathbf{r}, t)}{\partial t} = \frac{k_{\beta\sigma}^2 - k_{\beta\beta} k_{\sigma\sigma}}{ha_v} \Delta^2 \langle T_i \rangle^i \quad (14)$$

$$\frac{k}{k_{\beta}} = \frac{k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma}}{k_{\beta}} \quad (16)$$

$$\frac{\tau_T}{\tau_q} = 1 + \frac{\gamma_{\beta}^2 k_{\sigma\sigma} + \gamma_{\sigma}^2 k_{\beta\beta} - 2\gamma_{\beta} \gamma_{\sigma} k_{\beta\sigma}}{\gamma_{\beta} \gamma_{\sigma} (k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma})} \quad (18)$$

2. Page 033102-4: The line below Eq. (10) should read “where $k_{\beta\beta}$ and $k_{\sigma\sigma}$ are the effective thermal conductivities of the β -.”
3. Page 033102-4: The second line below Eq. (14) should read “conduction equation with $((k_{\beta\sigma}^2 - k_{\beta\beta} k_{\sigma\sigma}) / (ha_v)) \Delta^2 \langle T_i \rangle^i$ as the DPL.”
4. Page 033102-4: The fourth line below Eq. (17) should read “nanoparticle-fluid interface due to the term $k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma}$.”
5. Page 033102-4: The seventh line below Eq. (17) should read “thus focus on $k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma}$ to develop predicting models of thermo-.”
6. Page 033102-4: The paragraph above Eq. (18) should read “To show the possibility of conductivity enhancement, consider.”
7. Page 033102-4: The second line below Eq. (18) should read “of $\gamma_{\beta}^2 k_{\sigma\sigma} + \gamma_{\sigma}^2 k_{\beta\beta} - 2\gamma_{\beta} \gamma_{\sigma} k_{\beta\sigma}$. Therefore, by the condition for the ex-.”
8. Page 033102-5: The first equation should read

$$\gamma_{\beta}^2 k_{\sigma\sigma} + \gamma_{\sigma}^2 k_{\beta\beta} - 2\gamma_{\beta} \gamma_{\sigma} k_{\beta\sigma} < 0$$
9. Page 033102-5: The eighth line in the second paragraph in Sec. 4 should read “ k_{β} -enhancement can occur for all cases with $k_{\beta\beta} + k_{\sigma\sigma} + 2k_{\beta\sigma} > k_{\beta}$ (Eq.”
10. Page 033102-6: In the Nomenclature list the symbols k_{β} and k_{σ} should be changed into $k_{\beta\beta}$ and $k_{\sigma\sigma}$, respectively.

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