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Letter to the Editor

Dear Sir,

In reply to the letter from J. Sesták [1], we would like to make clear our opinion about his criticisms on our paper [2].

Firstly, we must reaffirm our conviction expressed in ref. 2 (eqns. (1) and (6)) in which the reaction rate is given by

$$r = \mathrm{d}\alpha/\mathrm{d}t = A \exp(-E/RT) f(\alpha) \tag{1}$$

(Valid for both isothermal and non-isothermal conditions.)

We think it is obvious [2,3] that, in the αTt space, the surface of isothermal curves is different from that of non-isothermal curves.
On applying the equation

$$\frac{\mathrm{d}\alpha}{\mathrm{d}t} = \left(\frac{\partial\alpha}{\partial t}\right)_T + \left(\frac{\partial\alpha}{\partial T}\right)_t \left(\frac{\mathrm{d}T}{\mathrm{d}t}\right) \tag{2}$$

to non-isothermal function, it has the meaning expressed in page 96 of ref. 2. Thus, if $(\partial\alpha/\partial t)_T$ is the time derivative of the non-isothermal curve (in non-isothermal surface) on the plane T, in accordance with the meaning of partial derivative, of course this is not the isothermal reaction rate at that temperature T.

The relationship between the $(\partial\alpha/\partial t)_T$ value and that obtained from the isothermal reaction rate appears in ref. 2. The temperature T' corresponding to the isothermal reaction rate is, logically, lower than the non-isothermal reaction rate temperature T and the isothermal curve is in the isothermal surface.

Equations (17) and (18) of ref. 2 connect T with T'. Reaction rate at T' is less than reaction rate at T and eqn. (15) of [2] gives the relationship between the reaction rates.

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LIST OF SYMBOLS

α	dimensionless extent of reaction
T	temperature
t	time

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E activation energy
A preexponential factor
d, ∂ derivatives
r reaction rate

REFERENCES

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3 A. Romero, E. García and A. Irabien, Thermochim. Acta, 73 (1984) 101.