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## Heats of Dissolution of Thiamine Disulfide-Fatty Acids Complexes in Ethanol\*

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The heats of dissolution ( $\Delta H_d$ ) of thiamine disulfide (TDS)-fatty acids (FA) complexes,  $(FA)_6(TDS)$ , were measured at 310.15 K in ethanol using a calorimetric technique, where the FA are tetradecanoic acid (C14), pentadecanoic acid (C15), hexadecanoic acid (C16), heptadecanoic acid (C17) and octadecanoic acid (C18). The values of  $\Delta H_d$  were 432.8, 475.0, 493.9, 541.0 and 558.5 kJ mol<sup>-1</sup> for  $(C14)_6(TDS)$ ,  $(C15)_6(TDS)$ ,  $(C16)_6(TDS)$ ,  $(C17)_6(TDS)$  and  $(C18)_6(TDS)$ , respectively. The values of  $\Delta H_d$  of  $(FA)_6(TDS)$  increased by increasing the carbon numbers ( $n$ ) of the constituent fatty acids. However, the plots of  $\Delta H_d$  of  $(FA)_6(TDS)$  against  $n$  showed a zig-zag pattern which indicates an upward convex at an odd-numbered position, while the plots of  $\Delta H_d$  of FA against  $n$  indicate a single line pattern.

The differences between  $\Delta H_d$  of  $(FA)_6(TDS)$  and  $\Delta H_d$  of  $(6FA+TDS)$  were 23–37 kJ mol<sup>-1</sup> for even-numbered FA and 33–41 kJ mol<sup>-1</sup> for odd-numbered FA, indicating a stronger binding force for  $(FA)_6(TDS)$  formed from odd-numbered FA than those formed from even-numbered FA. Furthermore, the estimated values of the binding force between FA and TDS are very small, leading to a conclusion that  $(FA)_6(TDS)$  is a clathrate (or an inclusion compound) formed by van der Waals forces and hydrophobic interactions between FA and TDS.

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