

Variation of ESR line shape with temperature

Product used : Electron Spin Resonance (ESR)

■ Variation of ESR signal of TEMPOL solution

TEMPOL was dissolved in the mixed solvent of ultrapure water and glycerin and was measured at some temperatures with a variable temperature controller (ES-13060DVT5). At 25 °C, the ESR signal was split into three lines ($2nI = 2 \times 1 \times 1 + 1 = 3$) due to the presence of one ^{14}N ($I = 1$) in the vicinity of an unpaired electron. Figure 1 shows that line shape and intensity of the ESR signal changes with temperature. An isotropic ESR signal is observed in solution phase due to fast molecular motion. On the other hand, the viscosity of the sample increases and the ESR signal line shape becomes anisotropic (anisotropic g and A tensors) as the temperature decreases. The mobility change of radical (such as the rotational correlation time) is estimated from the change of the ESR signal line shape^[1].

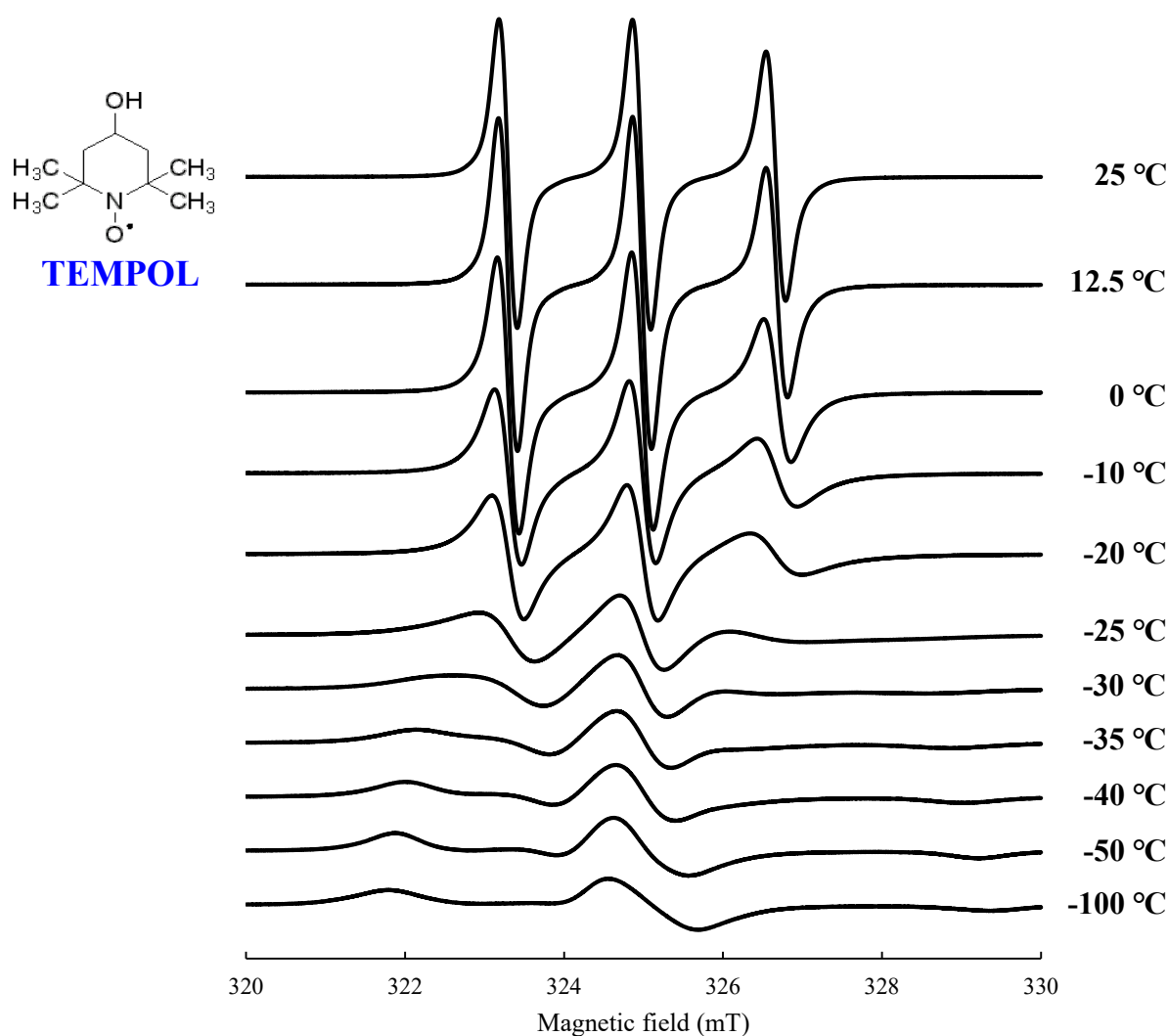


Figure 1. Temperature dependence of the ESR line shape of TEMPOL.

【Reference】

[1] Berliner J. L. (1976) : Spin Labeling : Theory and Applications (*Molecular Biology Series*, Vol 1), Academic Press, 608p.

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