

ESR measurement condition * * Microwave power ① * *

Product used : Electron Spin Resonance (ESR)

■ Microwave power dependence

The measurement conditions must be optimized to observe the proper ESR signal. The ESR signal intensity increases with increasing the microwave power which is one of the measurement conditions. Figure 1 shows the ESR spectrum of (A) TEMPOL in ultrapure water and (B) powder of copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). Figure 2 shows the signal intensity h for (A) and (B) changes with the square root value of the microwave power. The saturation phenomenon was observed for TEMPOL solution from the microwave power of around 4 mW (square root value: 2). No saturation phenomenon was observed for copper sulfate powder.

For observing unsaturated ESR signal, it is necessary to confirm the microwave power dependence for each sample and use the microwave power in the range where the signal intensity increases linearly. In general, organic radicals tend to saturate with a small microwave power, while metal ions tend to be difficult to saturate even with a large microwave power.

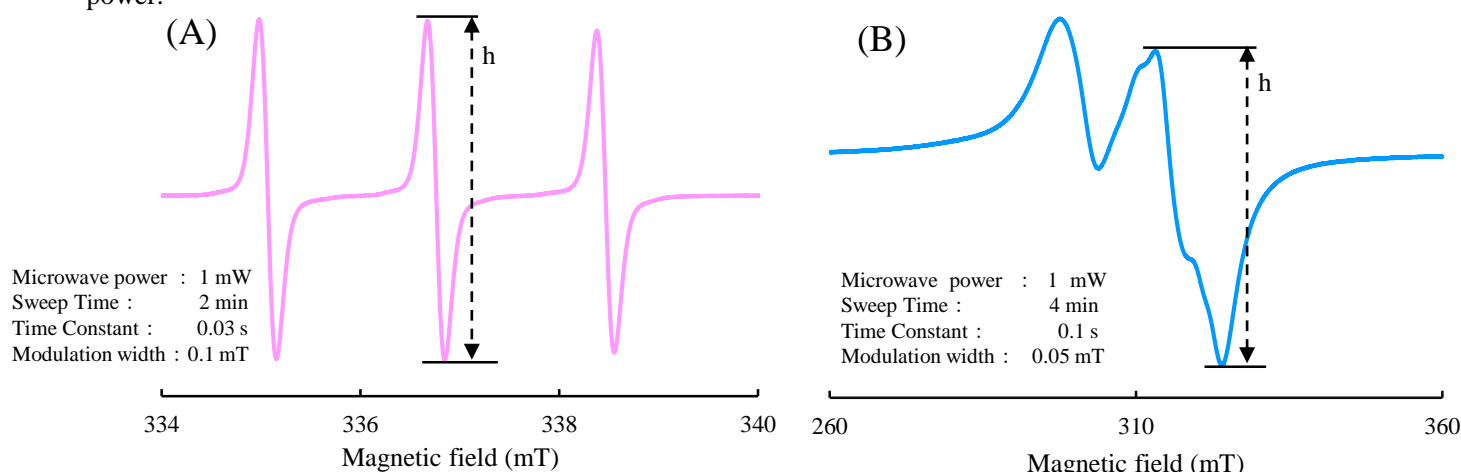


Figure1. ESR signal (RT)
 (A) TEMPOL (in ultrapure water) (B) Powder of copper sulphate

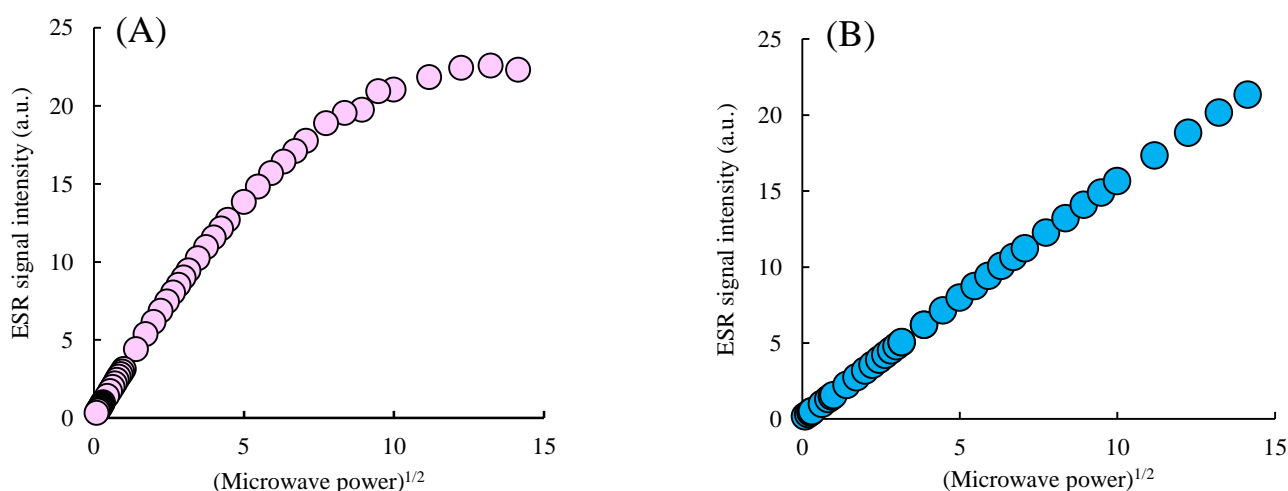


Figure 2. Microwave power dependence
 (A) TEMPOL (in ultrapure water) (B) Powder of copper sulphate

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