

テトラベンゾポルフィリン錯体における負の巨大磁気抵抗

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Giant negative magnetoresistance effect in an iron tetrabenzoporphyrin complex

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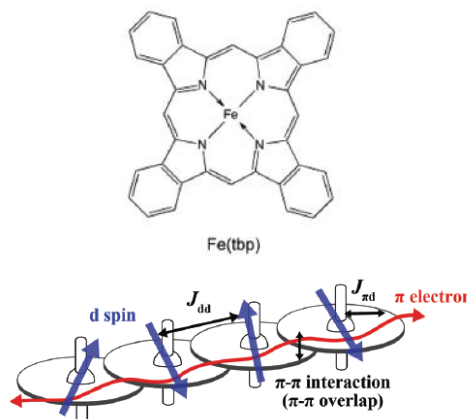


Figure 1. $\text{Fe}^{\text{III}}(\text{tbp})(\text{CN})_2$ 分子と分子間相互作用

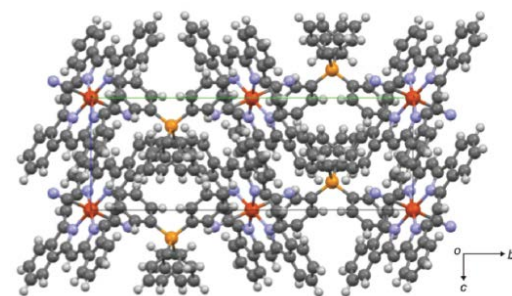


Figure 2. $\text{TPP}[\text{Fe}^{\text{III}}(\text{tbp})(\text{CN})_2]_2$ 錯体の結晶構造

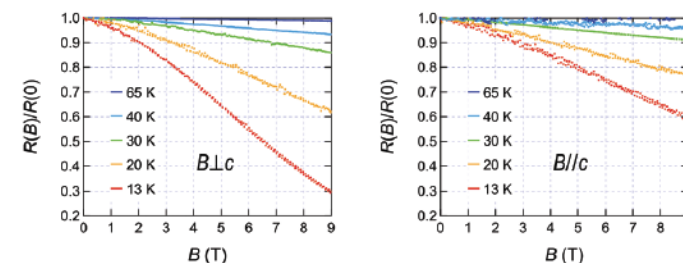


Figure 3. $\text{TPP}[\text{Fe}^{\text{III}}(\text{tbp})(\text{CN})_2]_2$ 錯体の c 軸に垂直 (左) および平行方向 (右) に測定した磁気抵抗の温度依存性

$\text{TPP}[\text{Fe}^{\text{III}}(\text{tbp})(\text{CN})_2]_2$ 錯体の磁場下における電気伝導度測定から、大きな異方性を伴う負の巨大磁気抵抗を見いだした。9 Tの磁場下における13 Kの磁気抵抗比は、結晶 c 軸に垂直な方向で-70%、および c 軸方向で-40%に達した。配位錯体の設計が、分子間の d - d 相互作用と π - π 相互作用に影響を及ぼし巨大磁気抵抗を変化させた。

By measuring the electrical resistivity in $\text{TPP}[\text{Fe}^{\text{III}}(\text{tbp})(\text{CN})_2]_2$ under the application of a static magnetic field, a giant negative magnetoresistance (MR) effect with high anisotropy is observed. More specifically, the MR ratio at 13 K under a field of 9 T perpendicular to the c axis is -70%, whereas the MR ratio under a field parallel to the c axis is -40%. The minor modification in coordination complexes can significantly affect the MR effect via tuning the intermolecular d - d interaction as well as the intermolecular π - π overlap.