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Studies on the Linear Antiferromagnets:
Magnetic Susceptibilities of Cupric Quinone Complex Salts
at Low Temperatures*

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Abstract

The magnetic susceptibilities of three Cu quinone complex salts were measured at low temperatures. These salts, Cu-Q-H, Cu-Q-Cl and Cu-Q-Br, are considered to have structure of magnetic one dimensional lattice. Cu-Q-H is obtained in the form of stick-like colloid whose length is shorter than a few thousand Å. Some characteristics of the antiferromagnetic linear chain were found in Cu-Q-H. At the lowest temperatures, the end effect and the odd or even number effect were examined. The length of the chain of Cu-Q-H is estimated to have the number of Cu^{2+} ions more than 9. The super-exchange interaction in a chain of each salt passes through the intervening quinone-molecule. The coupling constant J between nearest neighbored Cu^{2+} ions in Cu-Q-H was estimated to be between $-14k$ and $-24k$. The large J 's of three salts may be attributed to the superexchange interaction through the quinone-molecule.

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