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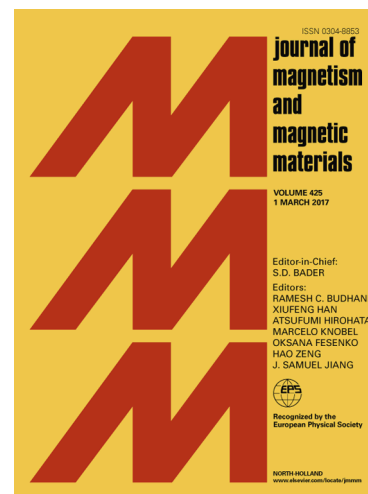
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**Anomalous ferromagnetic behavior and size effects in CuO nanowires**

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**Abstract**

In this work we show anomalous ferromagnetic behavior in CuO nanowires grown on top of a CuO/Cu<sub>2</sub>O bilayer produced *via* thermal oxidation in air at 400 and 500 °C for various annealing times. Our results show that there are strong size effects as well as temperature dependence governing the ferromagnetic-like behavior of the CuO nanowires. Thinner and longer CuO nanowires resulted in higher saturation magnetization values, which may be related to the presence of well-ordered and aligned surface unpaired electron spins and a high concentration of defects. Our results also show a competition between the anomalous ferromagnetic contribution arising from the CuO nanowires and the diamagnetic contribution arising from the Cu<sub>2</sub>O layer. Finally, the growth axis of the CuO nanowires was determined to be nearly perpendicular to the easy axis of magnetization of CuO.

Keywords: CuO, nanowires, oxidation, ferromagnetism, magnetization

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