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Cupric and cuprous oxide (CuO and Cu_2O) films were prepared on $\text{Al}_2\text{O}_3(0001)$ substrates by sol-gel method using single precursor solution made by dissolving $(\text{C}_2\text{H}_3\text{O}_2)_2\text{Cu} \cdot \text{H}_2\text{O}$ powder into a mixed solution of 2-methoxyethanol and monoethanolamine. CuO films were obtained by annealing in air in the 300 - 800 °C range while Cu_2O films could only be obtained by annealing in vacuum. Especially, Cu_2O coexist with copper quantum dots in the film. The optical, magnetic, and electrical properties of the films were measured by spectroscopic ellipsometry, vibrating-sample magnetometry, Mössbauer spectroscopy, and Hall effect measurements. Undoped CuO films exhibit p-type conductivity while the Fe doped ones insulating. The $\text{CuO}:\text{Fe}$ films show no second phase; nonetheless they are found to exhibit ferromagnetism at room temperature.