Properties of $La_{1.85}Sr_{0.15}CuO_4/La_{0.5}Sr_{0.5}MnO_3$ nanowire networks

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In some former work, we have successfully fabricated $La_{1-x}Sr_xMnO_3$ with various x level, and $La_{1.85}Sr_{0.15}uO_4$ nanowires/nanoribbons via electrospinning [1-3]. The CMR of the $La_{1-x}Sr_xMnO_3$ nanowire networks have been investigated, and the T_C of the $La_{1.85}Sr_{0.15}uO_4$ nanowires and nanoribbons are around 19.2 K and 29.3 K respectively. Currently, we establish a $La_{1.85}Sr_{0.15}CuO_4/La_{0.5}Sr_{0.5}MnO_3$ nanowire hybrid system. From obervation by scanning electron microscopy, the average diameter of the nanowires is around 220 nm and the average length can reach over 50 μm. The randomly aligned $La_{1.85}Sr_{0.15}CuO_4$ and $La_{0.5}Sr_{0.5}MnO_3$ nanowires show numerous connections and form a complicated hybrid network system.
The nanowires are polycrystalline with a grain size at around 30 nm as confirmed by transmission electron microscopy. According to four-probe electrical transportation measurements, superconductivity of the sample is suppressed and an anti-magnetoresistance effect is observed. In further experiments, the field angular dependence of the sample magnetization was investigated by tilting the angle within the applied magnetic field. SQUID measurements of *M(T)* and *M(H)* were carried out as well, revealing the soft magnetic character of the nanowires.

References

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