

Brief Report

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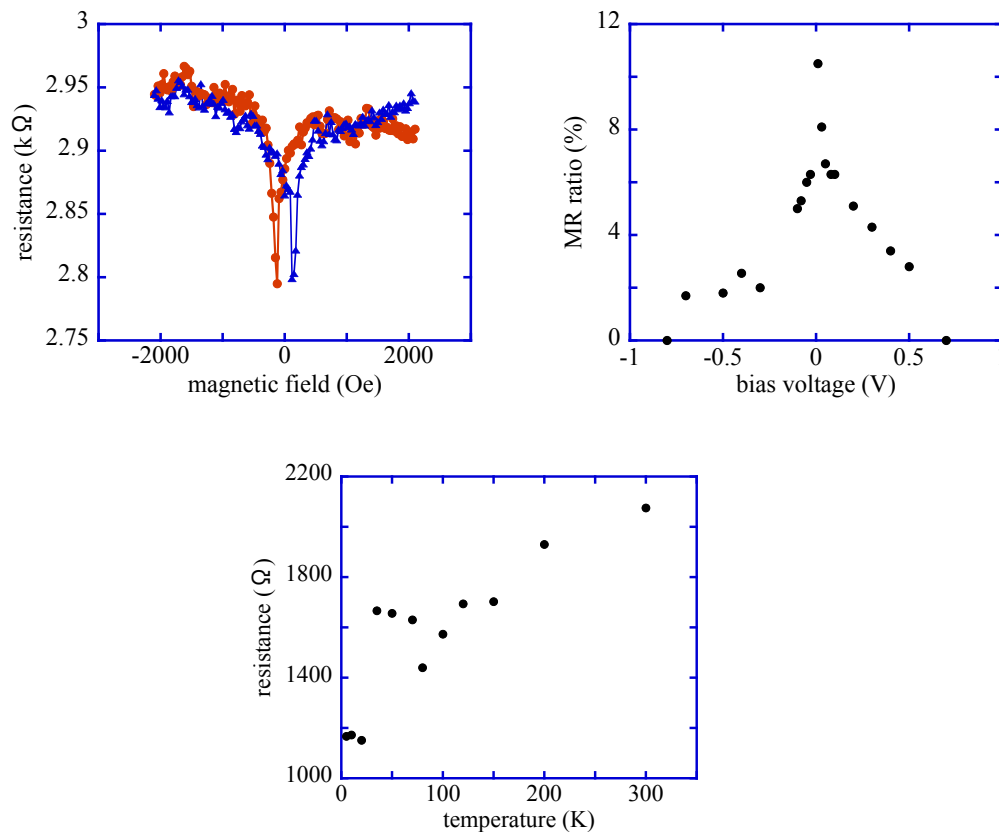
I tried to fabricate LSMO/organic/Co sandwich spin valve. Organic materials are C_{60} , PTCDI (*N,N'*-Dioctyl-3,4,9,10-perylenedicarboximide) (both are n-type), TPD (*N,N'*-Diphenyl-*N,N'*-di(m-tolyl)-benzidine) (p-type).

1. C_{60}

As I reported before, negative MR was observed when the thin film (75 nm) was evaporated. Next, thick C_{60} film (200- 3000 nm) was prepared. However, current scale is very low (< 1 nA) and no MR was observed. I think it's difficult to make thick C_{60} film. So I purchased PTCDI and tried.

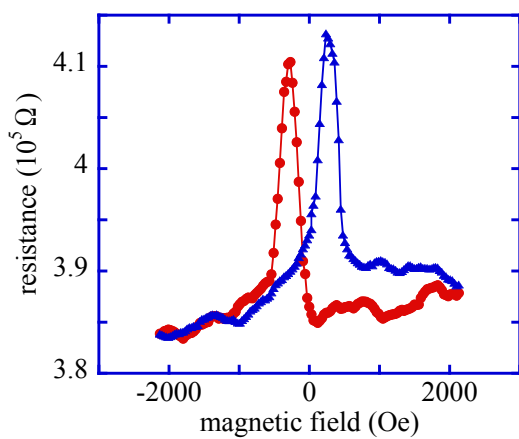
2. PTCDI

First, 150 nm PTCDI was prepared to check the quality of film and the resistance. Resistance is about $k\Omega$. MR was observed at 5K as below. Next, I'm going to fabricate thick film (~ 300 nm).

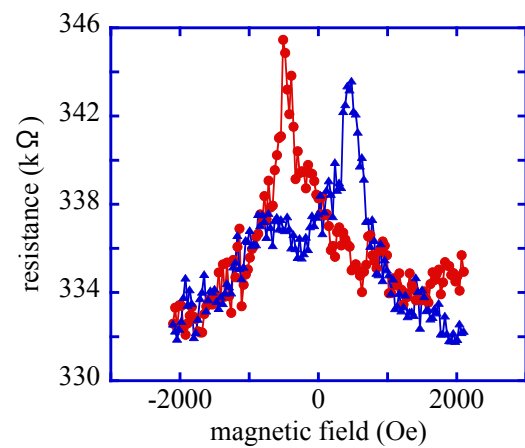


3. TPD

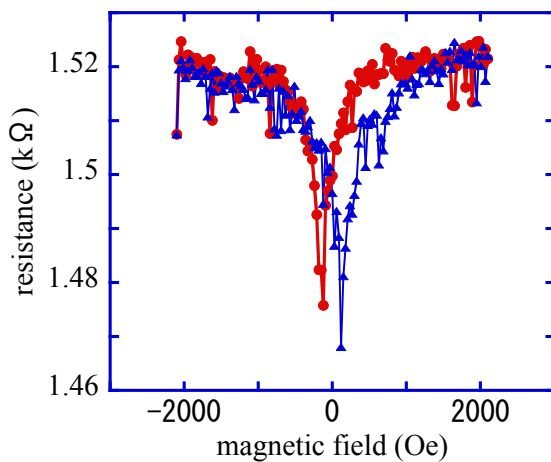
In the previous report, both positive and negative MR were observed by changing the thickness of TPD film. Some groups have been reported the change of MR by changing the thickness of organic materials, while there is no report both positive and negative MR were observed with the same LSMO/organic/Co structure. So, I tried to change the thickness gradually. 200, 150, 50 and 7.5 nm TPD film were prepared. MR was observed with all thickness devices (7.5 nm and 50 nm: negative, 150 and 200 nm: positive). However, 7.5 nm sample showed about 9 k Ω , while 50 nm sample shows about 1 k Ω . I think this is due to the diffusion of the top electrode into the organic layer.



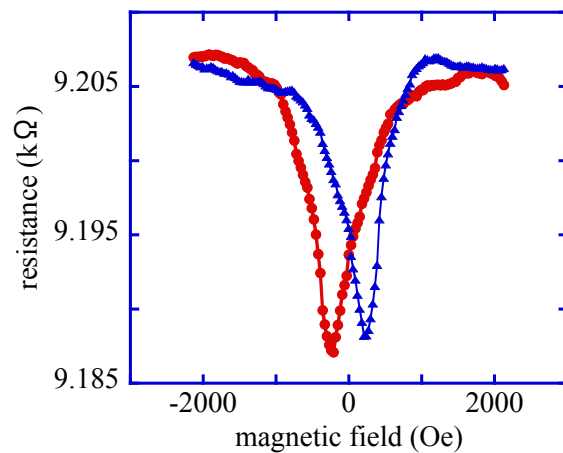
200 nm



150 nm



50 nm



7.5 nm