Abstract Submitted
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Magnetic tunnel junction based on $Mn_{2-x}Co_{2x}Ni_{1-x}O_4$ Mixed valent manganite spinels[1] JING WU, ZHIMING HUANG, JUNHAO CHU, Shanghai Institue of Technical Physics, Chinese Academy of Science — $Mn_{2-x}Co_{2x}Ni_{1-x}O_4$ ($0 \leq x \leq 1$) (MCNO), developing basically from the prototype of Mn_3O_4, which are spinel-structure mixed-valent manganites and electrical and magnetic properties are closely linked with interactions among spin, orbit and lattice. The electrical conduction mechanism in MCNO is small polarons hopping between localized Mn3+ and Mn4+ octahedral sites. As we known, the magnetic orders of spinel-structure transition metal oxide are commonly ferrimagnetic with antiferromagnetic exchange between tetrahedral and octahedral sites. The conductive electron i.e. e_g orbital electron hopping between octahedral Mn^{3+} and Mn^{4+} sites tends to be totally spin polarized due to the strong ferromagnetic couple between octahedral sites. Vice versa, the hopping electron enhanced the ferromagnetic couple between Mn^{3+} and Mn^{4+} sites by RKKY indirect exchange interaction. This feature of MCNO is very potential for developing MTJ due to the totally spin polarized conductive electrons. MTJs based on MCNO have been constructed by Magnetron Sputtering method. The performance of these MTJs is under studying at present.

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