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Chirality Induced Spin Selectivity for Memory Applications RAHAMIM GULIAMOV, SHINTO MATHEW, KIRAN VANKAYALA, Department of Chemical Physics, Weizmann Institute of Science, Rehovot, Israel, HAGAY MOSHE, YITZHAK MASTAI, Department of Chemistry, Bar-Ilan University, Ramat-Gan Israel, RON NAAMAN, Department of Chemical Physics, Weizmann Institute of Science, Rehovot, Israel, PROF. RON NAAMAN GROUP COLLABORATION[1], PROF. YITZHAK MASTAI GROUP COLLABORATION[2]
— Creation and manipulation of spin current is one of major aspects of memory devices. In conventional devices spin-polarized current is created by permanent magnetic layer. Further miniaturization of the memory is limited by super-paramagnetic behavior of layer. Hence, high density memory requires out-of-plane geometry with perpendicular magnetic anisotropy. Achieving this goal with inorganic magnetic layers is a challenge. We present a new approach in which the permanent magnetic layer has been replaced with inorganic chiral film producing spin polarized current due to Chirality Induced Spin Selectivity (CISS) effect. Chiral Al_2O_3 film grown by ALD on self-assembled monolayer of chiral molecules acts as a spin filter. Spin polarization is parallel/antiparallel to the electron velocity depending on chirality. Devices show asymmetric magneto-resistance and slopes with opposite sign for left/right handed chirality. Hence, CISS-effect based device shows, for first time, an asymmetric magneto-resistance, which has potential application in magnetic memory and magnetic field sensors. Reference: Shinto P. Mathew et al., *Appl. Phys. Lett.* 105, 242408 (2014)

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