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Self-assembly of monolayers on SFMO for fabrication of molecular magnetic tunnel junctions PATRICK TRUITT, Montclair State University, HAILONG WANG, FENGYUAN YANG, EZEKIEL JOHNSTON-HALPERIN, The Ohio State University — Half-metallic oxides, such as $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) and Sr_2FeMoO_6 (SFMO), are highly spin polarized and air stable, making them attractive as spin injectors for organic and molecular spintronics. Recently, it was demonstrated that self-assembled monolayers (SAMs) of alkylphosphonic acids can be grafted onto LSMO while maintaining LSMO's spin polarization. However, due to its relatively low Curie temperature, the magnetoresistance of devices based on LSMO is severely curtailed at room temperature. In contrast, SFMO has a $T_C > 400$ K. As a first step in incorporating this material in a molecular magnetic tunnel junction, we show that it also supports alkylphosphonic SAMs. Epitaxial SFMO films are grown on STO via off-axis sputtering and have a room temperature magnetic moment per formula unit of about 1.2 μ_B and a Fe:Mo stoichiometry ratio of 0.9:1.0, determined by RBS. The quality and structure of SAMS grafted on these films is interrogated through methods including contact angle measurements, AFM, and FTIR spectroscopy. Progress towards fully realized spin polarized tunnel junctions and implications for room temperature molecular spintronics will be discussed.

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