Organic multiferroic tunnel junctions with ferroelectric poly(vinylidene difluoride) barriers J. M. LOPEZ, University of Puerto Rico, Y. SUN, J. D. BURTON, E. Y. TSymbal, University of Nebraska - Lincoln, J. P. VELEV, University of Puerto Rico — Organic polymers, such as poly(vinylidene difluoride) (PVDF), form high quality ordered layers and exhibit robust ferroelectricity down to a monolayer [1]. This property makes PVDF polymers promising as barriers in multiferroic tunnel junctions (MFTJs) — devices which exhibit multiple resistance states associated with different magnetization and ferroelectric polarization configurations [2]. In this work we present first-principles calculations of the spin-polarized tunneling conductance of crystalline Co/PVDF/Co(0001) MFTJs. Using the Landauer-Büttiker formalism implemented within a plane-wave pseudopotential method we calculate spin-resolved transmission for parallel and antiparallel magnetization of the electrodes. Our calculations predict a negative spin polarization of the tunneling conductance and a sizable tunneling magnetoresistance (TMR) in these junctions. Further efforts are aimed at exploring the tunneling electroresistance (TER) effects in asymmetric MFTJs where a monolayer of Au is deposited at one of the interfaces. Our results indicate that organic ferroelectric materials may open a new promising direction in organic spintronics. [1] A. V. Bune et al, Nature 391, 874 (1998). [2] J. P. Velev et al, Nano Lett. 9, 427 (2009).