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From toothpaste to topological insulators and materials for valleytronics: The journeys of fluorinated tin SALVADOR BARRAZA-LOPEZ, PABLO RIVERO, University of Arkansas, JIA-AN YAN, Towson University, VICTOR MANUEL GARCIA-SUAREZ, JAIME FERRER, Universidad de Oviedo — Tin fluoride has a vast literature [1]. This material is stable in bulk form at room temperature and has commercial applications that include fluorinated toothpaste. Bulk tin fluoride has a pair of fluorine atoms bridging two tin atoms. In the recent past the electronic properties of 2D tin with honeycomb structure have been discussed [2] thus generating a wealth of literature that emphasizes its non-topologically-trivial electronic properties due to the combination of a Dirac-like dispersion and a strong spin-orbit coupling given its large atomic mass [3]. Nevertheless the stability of such freestanding structures has been contested recently [2]. As it turns out, the most stable form of fluorinated tin does not possess a graphane-like structure either [4]. In the most stable phase to be discussed here, fluorine atoms tilt away from (graphane-like) positions over/below tin atoms; in an atomistic arrangement similar to the one seen on their parent bulk structure. Electronic properties depend on atomistic coordination, and the most stable form of fluorinated tin does not possess non-trivial topological properties. Nevertheless it represents a new paradigm for valleytronics in 2D. References: [1] G. Denes, et al. *J. Solid State Chem.* **33**, 1 (1980). [2] Y. Ma, et al. *J. Chem. Phys. C* **116**, 12977 (2012); Y. Xu, et al. *PRL* **111**, 136804 (2013); P. Tang, et al. *PRB* **90**, 121408(R) (2014). [3] C. L. Kane and E. J. Mele. *PRL* **95**, 226801 (2005). [4] P. Rivero et al. Submitted on 07/27/14.

Salvador Barraza-Lopez
University of Arkansas

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