QUERY:

“Recently, I synthesized 3-Phenylpropyl t-butylsulfamate following the procedure of the Short et al. In the purification part, I isolated product with some impurities confirmed by 1H NMR. The problem was the product of the reaction has very low UV activity, as well as variety of stains that I tried (KMnO4, CAM, Ninhydrine, Iodine, PMA) didn’t give a visible response. I just wanted to ask you what kind of stain your group used for the product that I aforementioned.”

RESPONSE:

We do not typically have any issues with impurities or visualization of the sulfamate esters. We have found that the quality of the sulfamic acid salt used, and the purity of triflic anhydride (we keep ours in the glovebox) are important for yield. Typically, we only detect desired sulfamate, unreacted alcohol, and triphenylphosphine oxide at the end of the reaction. Below we are providing an improved preparation of the triethylammonium tert-buty1 sulfamate salt along with pictures of the product. Additionally, this document contains TLC plates with different stains used to visualize the sulfamate ester product (from the subsequent step). We hope this information helps solve any issues you’re having.

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\text{Bu}^+\text{NH}_2 + \text{SO}_3\text{•pyr} \rightarrow \text{Et}_3\text{N} \rightarrow \text{Bu}^+\text{NSO}_3\text{MeCN} + \text{Et}_3\text{N}^+\text{SO}_3\text{OEt}_3
\]

A round bottom flask equipped with magnetic stir bar was charged with sulfur trioxide pyridine complex (SO$_3$•pyr, 1.0 equiv). Acetonitrile (0.33 M) was then added in a single portion without taking any precautions to exclude air or moisture. The suspension was stirred for 22 °C until all of the SO$_3$•pyr had dissolved. Upon complete dissolution, the reaction flask was cooled at 0 °C in an ice water bath and capped with a rubber septum containing a nitrogen inlet. Tert-buty1amine (1.0 equiv) was then added dropwise via syringe. Following complete addition of amine, Et$_3$N (1.1 equiv) was added dropwise. The reaction was removed from the ice bath and stirred for 0.5 h. Upon completion, the solvent was removed under reduced pressure to give a triethylammonium sulfamate salt, which was further dried on the high vacuum overnight in the reaction flask. The resulting yellow solid was then scraped from the flask and transferred to a vial for storage without exposing the solid to solvent. The salt was used without further purification.
TLCs were performed in 4:1 Hexanes:EtOAc

Left lane: 3-phenylpropanol
Middle lane: co-spot
Right lane: 3-phenylpropyl tert-butylsulfamate