Sulfonyl Chlorides from Sulfonic Acids

Reaction:

\[
\text{F}_3\text{C} \overset{\text{ONa}^+}{\text{SO}} \xrightarrow{\text{PCl}_3} \text{F}_3\text{C} \overset{\text{Cl}}{\text{SO}} \quad + \quad \text{POCl}_3 + \text{NaCl}
\]

Mechanism:

Sulfonyl chlorides are valuable for the synthesis of sulfonates, which are very good leaving groups. These can be used in S_N2 reactions.

Aromatic sulfonyl chlorides can be synthesized by the reaction of 2 equivalents of a sulfonyl chloride. The reaction forms a sulfonic acid first then the second equivalent will produce the sulfonyl chloride.

Reaction:

Mechanism
The mechanism for the production of the sulfonic acid resembles an EAS reaction.