



SiliaBond®

Triphenylphosphine and Triphenylphosphine Oxide Scavenging Using SiliaBond Organic Scavengers

Triphenylphosphine (*TPP*) is a reagent frequently used in organic synthesis. This compound has the property of being easily oxidized to generate the Triphenylphosphine oxide (*TPPO*), and this characteristic is often exploited in organic chemistry in various reactions. However, *TPP* and *TPPO* are quite difficult to remove using traditional chromatography methods, which is why the SiliaBond organic scavengers become an interesting alternative for their removal from reaction media.

LEARN MORE

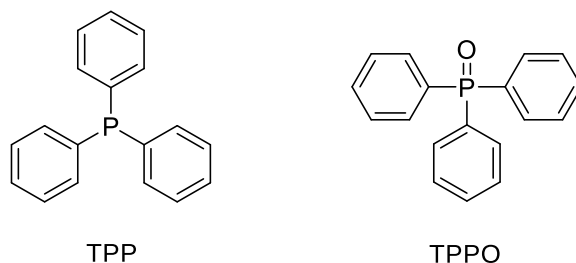
about SiliaBond in our brochure “Solutions for Scavenging of Metal & Organic Impurities”.



Triphenylphosphine (TPP) is a common organophosphate reagent. Since it's an inexpensive product, it is commonly used for organic and organometallic compounds syntheses.

TPP can easily be oxidized in Triphenylphosphine oxide (TPPO), and this property is exploited in many organic reactions. For example, TPP is used to deoxygenate organic peroxides. It is also oxidized in Wittig, Mitsunobu, and Appel reactions as well as in the hydrolysis of the Staudinger reaction product.

Figure 1: Triphenylphosphine (TPP) and Triphenylphosphine oxide (TPPO) structures



However, removing TPP and TPPO from the crude product using chromatographic methods remains quite a challenge. Fortunately, the SiliaBond organic scavengers offer an alternative solution to this problem. To this end, multiple scavengers have been tested to remove these two products and three of them (Figure 2) showed promising results (Table 1).

Figure 2: Structures of the 3 promising SiliaBond organic scavengers

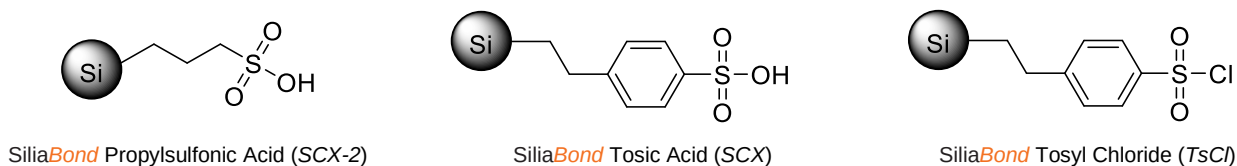


Table 1: Scavenging of Triphenylphosphine (TPP) in dichloromethane, and Triphenylphosphine oxide (TPPO) in acetonitrile, at 22°C for 24 hours

TPP and TPPO Scavenging at 22°C for 24 Hours			
SiliaBond	Number of Equivalents	Scavenging Efficiency (TPP) (%)	Scavenging Efficiency (TPPO) (%)
SiliaBond Propylsulfonic Acid	4	80	83
	10	93	88
SiliaBond Tosic Acid	4	76	88
	10	94	91
SiliaBond Tosyl Chloride	4	69	66
	10	97	83



APPLICATION NOTE

#Appn_SBS001-0



CONCLUSION

This study demonstrated that three SiliaBond organic scavengers are able to remove TPP and TPPO from a pure solvent. In order to reproduce these results in a real reaction medium, it will be important to ensure that the SiliaBond scavenger selected will not react with the final product to avoid losing the final product during the purification process, which of course would impact the overall reaction yield.



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