Triphenylphosphine in reactions with ω-haloalkylcarboxylic acids

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Triphenylphosphine was involved to reactions with ω-haloalkylalkylcarboxylic acids.

$$Ph_3P + Hlg(CH_2)nCOOH \longrightarrow [Ph_3\overset{\oplus}{P}(CH_2)n\,COOH]\,Hlg^{\ominus}$$
1-8

Hlg = Cl, Br; n = 1, 2, 3, 4;

The structure of obtained phosphonium salts **1-8** has been confirmed by complex of physical and physico-chemical methods, including X-ray analysis for three compounds.

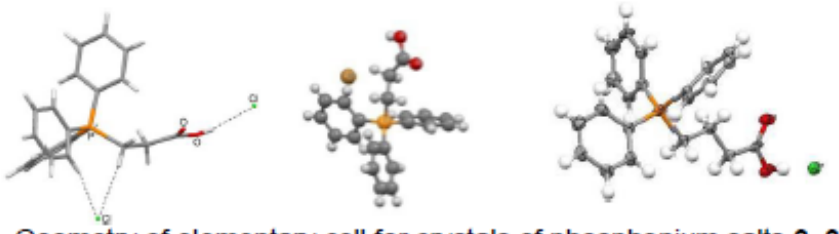


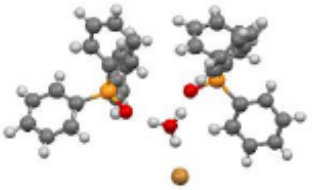
Figure 1. Geometry of elementary cell for crystals of phosphonium salts **2**, **3** and **6**

On the second stage phosphonium salts 2-4 and 6-8 have been treated by 1 M aqueous solution of sodium hydroxide with the formation of phosphabetaines 9-11. The similar treatment of phosphonium salts 1 and 5 doesn't lead to target phosphabetaines.

$$[Ph_3\overset{\oplus}{P}(CH_2)n\,COOH]\,Hlg^{\ominus} \xrightarrow[-NaHlg]{NaOH} Ph_3\overset{\oplus}{P}(CH_2)nCO\overset{\ominus}{O}$$
2-4, 6-8 **9-11**

Hlg = Cl (**2-4**), Br (**6-8**); n = 2, 3, 4;

Interaction of triphenylphosphine with bromoacetic acid by alloyage in absence of solvent leads to formation of three products, the major being complex with M.p. 137°C confirmed by X-ray analysis.



$$Ph_3P + BrCH_2COOH \longrightarrow \underset{298\ ^\circ C}{[Ph_3\overset{\oplus}{P}CH_2COOH]\overset{\ominus}{Br}} + \underset{96\ ^\circ C}{Ph_3P{=}CH_2} + \underset{137\ ^\circ C}{[Ph_3P{=}O]_2{\cdot}H_2O{\cdot}HBr}$$

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