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A New Route to Aryl-Phosphonites and Arylen-Bis-Phosphonites-Stabilizers for Plastics

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A NEW ROUTE TO ARYL-PHOSPHONITES AND ARYLEN-**BIS-PHOSPHONITES - STABILIZERS FOR PLASTICS**

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Abstract Aryl-phosphonites and arylen-bis-phosphonites are synthesized by a new grignard route. These compounds are useful as stabilizers for plastics.

Arylen-bis-phosphonites are used as stabilizers for polymeres. The most known is compound 3 with Ar₁ = 4,4'-biphenyl, called PEP-Q. It is produced by a Friedel-Crafts-phosphorylation of biphenyl with PCl, and reaction with 2,4-di-tert-butylphenol according to a process claimed by the Sandoz AG.¹

A new grignard route gives access to PEP-Q in high yield. The grignard compound of 4,4'-dibromo biphenyl (1) is reacted with bis-(2,4-di-tert-butylphenyl) chlorophosphite 2 to afford PEP-Q (3 with Ar, = 4,4'-biphenyl). The grignard reaction is strongly influenced by ultrasound. Without using ultrasound the yield is about 35%, while using ultrasound the yield is as high as 85%.

BrMg-Ar₁-MgBr + 2 Cl-P(OR)₂
$$\longrightarrow$$
 (RO)₂P-Ar₁-P(OR)₂ 3 for example: PEP-Q: Ar₁ = \longrightarrow and R = 2,4-di-tert-butyl-phenyl Ar₂-MgBr + Cl-P(OR)₂ \longrightarrow Ar₂-P(OR)₂ \longrightarrow Ar₂-P(OR)₂ \longrightarrow Ar₃-P-OR \longrightarrow Ar₄-P-OR \longrightarrow Ar₄-P-OR \longrightarrow Ar₅-P-OR \longrightarrow Ar₇-P-OR \longrightarrow Ar₇-

Reacting a grignard reagent Ar,-MgBr 4 with 2 gives the new phosphonites 5, with e. g. $Ar_1 = 1$ -naphthyl, 4-tert-butylphenyl, 2,4-dimethylphenyl, in high yields. These compounds are also efficient stabilizers for plastics. In a similar way diarylphosphinites 6 and aryl-phosphonamidites 7 are synthesized by the reaction of the corresponding halo-phosphorus-compound and an aryl-grignard reagent.

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