Sustainable one-pot preparation of versatile organo-phosphorus compounds

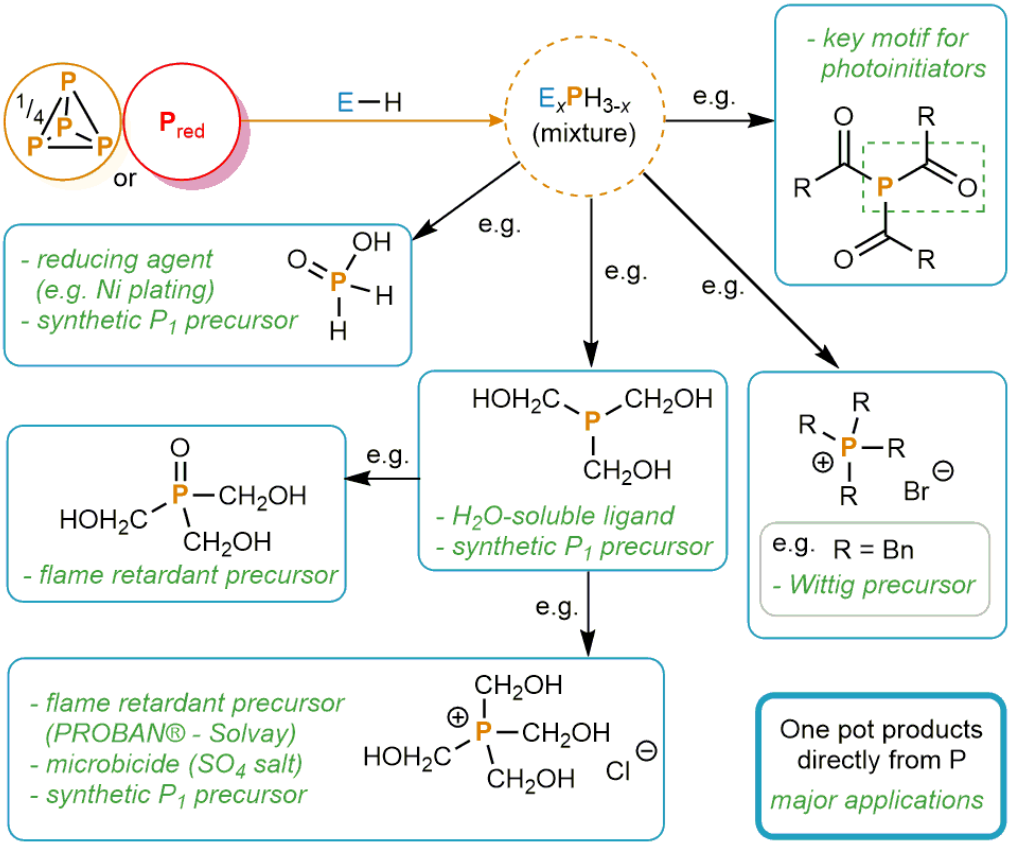
Reference No: B79039

CHALLENGE

Current industrial production of phosphorus-containing products from P_4 (which is the source of P atoms for these compounds) requires multiple reaction steps and involves the use of extremely hazardous reagents and intermediates (e.g. PCl_3, PH_3, Cl_2) that are difficult and/or expensive to employ safely. The need for multiple reaction steps has inevitable negative consequences for overall space/time yield and amplifies the formation of waste. It also leads to practical complications, as intermediate products must be isolated and purified prior to subsequent steps.

INNOVATION

Our method instead provides **industrially relevant phosphorus-containing products in a single step**, without the need for tedious or time-consuming isolation of any intermediates. It is simple to implement and **avoids the use of especially hazardous or difficult-to-handle reagents.**



COMMERCIAL OPPORTUNITIES

Our methodology is likely to be of particular interest to chemical companies working at the 'fine chemicals' (rather than 'bulk chemicals') end of the industry, where there is less scope to mitigate practical or safety problems through bespoke reactor design, and these concerns are therefore especially acute. Given the wide-ranging uses of phosphorus-containing compounds there are a great many specific areas of potential interest. An application example is the preparation of acyl-phosphine oxide photoinitiators (MAPOs/BAPOs), and flame retardant precursors (e.g. THPC), for which we have already shown that our method can be used to produce relevant compounds. We are looking for industry partners for further development and/or licensing.

DEVELOPMENT STATUS

The inventors have used the process for preparations in scale of several grams.

BayPAT

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Technology from UNIVERSITY OF REGENSBURG

IP rights:
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