# GREEN PROCESS FOR FIREPROOF PLASTICS

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**Organophosphorus Flame Retardants**, on use for their **fire-resistant** properties, can now be produced with a more **efficient and ecological synthetic strategy**, to be applied in particular for aromatic derivatives containing P(=O)-heteroatom, which are compounds arousing great interest because of their multiple structural diversifications and good flame retardant effect in both gas and condensed phase.

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## DESCRIPTION:

The European Commission put additional restrictions to the use of halogen-based flame retardants starting from 2002, due to their harmful effects on health and the environment. Organophosphorus Flame Retardants are therefore rising as one of the most promising alternatives for **plastic fireproofing** in a wide range of applications, particularly aromatic derivatives containing the P(=O)-heteroatom moiety, such as DOPO-derivatives. Nevertheless, synthetic pathways for these compounds requires the use of highly impactful agents towards the environment (e.g. carbon tetrachloride [$CCl_4$], a carcinogen compound and with ozone-depleting and greenhouse gas effect). Inventors have identified an **efficient, industrially scalable** and more **sustainable** process (TRL4) for functionalization of molecules such as 9,10-dihydro-9-oxa-10-phosphaphenanthrene-10-oxide (DOPO) and dibenzo[d,f][1,3,2]dioxaphosphepine 6-oxide (BPPO).

## ADVANTAGES:

- More economically efficient and industrially scalable strategy
- More sustainable process

## APPLICATIONS:

- Flame retarded thermoplastic materials (e.g. ABS, PS, SAN, TPU, PMMA)
- Flame retarded polymeric resins and coatings (e.g. PUR, NIPU, Epoxy, Acrylic)