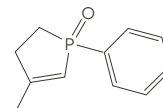


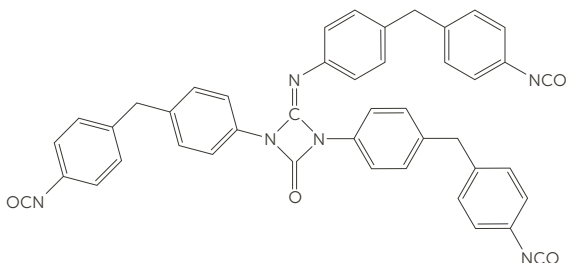
# 3-Methyl-1-phenyl-2-phospholene-1-oxide

Product number: 525 | Alternative name: MPPO | CAS number: 707-61-9 |  $C_{11}H_{13}OP$  | Molecular weight: 192.19

3-Methyl-1-phenyl-2-phospholene-1-oxide (MPPO) is a hygroscopic white solid (m.p. 58° – 65°C [136° – 149°F]), which is stable to over 300°C (572°F). MPPO is soluble in polar solvents and relatively sensitive to aqueous alkaline conditions, exhibiting both polymerization and addition of water.<sup>1</sup>

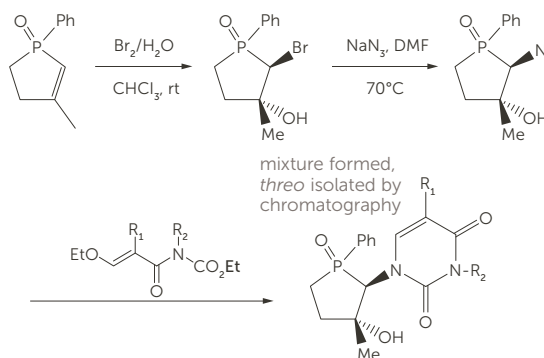


## CATALYST FOR MANUFACTURE OF URETONIMINE-MODIFIED MDI<sup>2,3</sup>



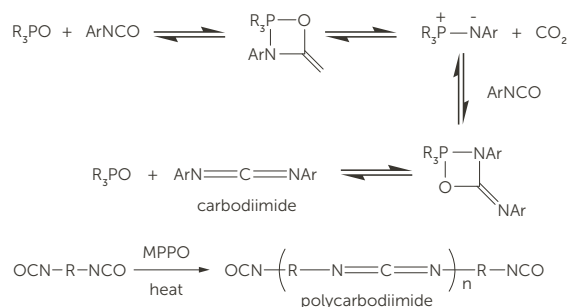
Production of polyurethane products is simplified using uretonimine-modified MDI, a room temperature stable liquid.

## SYNTHESIS OF DEOXY PHOSPHA-SUGAR PYRIMIDINE NUCLEOSIDES<sup>7-9</sup>



Prepared phospho-sugar pyrimidine nucleosides are potential inhibitors of HIV.

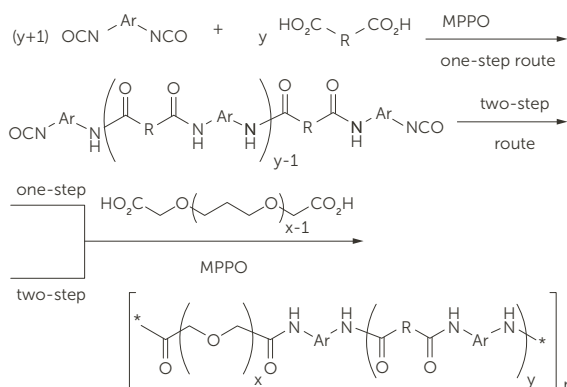
## PREPARATION OF CARBODIIMIDES AND POLYCARBODIIMIDES<sup>4-6</sup>



R = aryl (including 4,4'-MDI, 2,4-TDI, 2,6-TDI)

MPPO used for manufacture of carbodiimides and polycarbodiimides eliminates water as a byproduct resulting in purer product.

## SYNTHESIS OF POLYOXYETHYLENE-POLYAMIDE MULTIBLOCK COPOLYMERS<sup>10</sup>



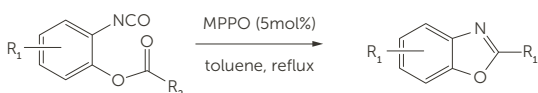
Ar = 4,4'-MDI

R = 50% mix of m-xilylenyl and  $-(CH_2)_7-$

MPPO facilitates both processes with the choice of a convenient one-step route or a two-step route resulting in copolymer with enhanced morphology.

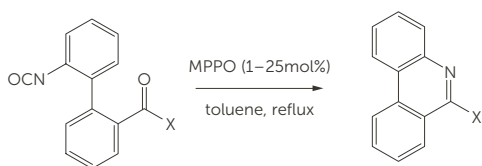
**CATALYST FOR AZA-WITTIG CYCLIZATIONS TO HETERO CYCLIC COMPLEXES**<sup>11-14</sup>

MPPO catalyzes the cyclization of isocyanates and azides to form heterocyclic motifs that are commonly used in biologically active entities for pharmaceutical and agrochemical treatments.



$R_1 = H, MeO, F$   
 $R_2 = Me, \text{ various aryls}$

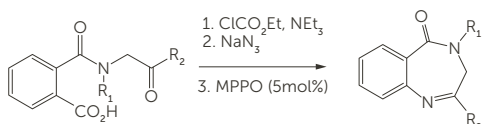
*Benzoxazoles*  
16 examples  
38 – 87% yield



$X = OMe, OEt, OiPr, NCy, NEt_2$

*Phenanthridines*  
9 examples  
30 – 82% yield

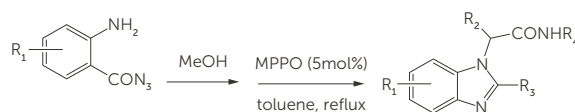
MPPO catalyzes benzoxazoles and phenanthridine formation via iminophosphorane/intramolecular aza-Wittig cyclization of an aryl isocyanate.<sup>11</sup>



$R_1 = \text{ aryls}$   
 $R_2 = tBu, \text{ aryls}$

*1,4-Benzodiazepine-5-one*  
16 examples  
71 – 89% yield

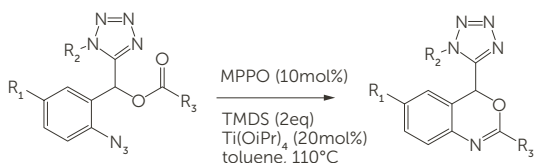
Benzodiazapin, a widely used motif in biologically active compounds, can be accessed via MPPO-catalyzed aza-Wittig reaction of an isocyanate intermediate via an acyl azide.<sup>12</sup>



$R_2CHO$   
 $R_3CO_2H$   
 $R_4NC$

*Benzimidazoles*  
22 examples  
51 – 84% yield

Multi-substituted benzimidazoles can be prepared in one pot from a four-component, multi-step sequential Ugi/MPPO-catalytic Aza-Wittig reaction of 2-aminobenzoyl azides.<sup>13</sup>



$R_1 = H, Cl$   
 $R_2, R_3 = \text{ aryls, alkyl}$

*4-Tetrazole-substituted*  
*4H-3,1-Benzoxazines*  
21 examples  
73 – 92% yield

Tetrazoles and benzoxazines complexes are bioactive in antifungal, antitubercular, and anticancer treatments. The cyclization is catalyzed by the reduced form of MPPO with tetramethyldisilane and  $Ti(OiPr)_4$ . The reaction is driven by the oxidation of the reduced-MPPO to MPPO.<sup>14</sup>

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