

## ALKYL-PHOSPHONATE IONIC LIQUIDS

REFERENCES	IONIC LIQUIDS
Dim0126c	1,3-Dimethylimidazolium Methyl-Phosphonate, 98% [DiMim][(MeO)(H)PO <sub>2</sub> ]
Im0229c	1-Ethyl-3-methylimidazolium Ethyl-Phosphonate, 98% [EMim][(EtO)(H)PO <sub>2</sub> ]
Im0226c	1-Ethyl-3-methylimidazolium Methyl-Phosphonate, 98% [EMim][(MeO)(H)PO <sub>2</sub> ]

### Experimental aspect :

Alkyl-Phosphonate ionic liquids are:

- hydrophilic
- liquid at room temperature
- protic
- stable with water and oxygen
- low-viscosity liquids
- easily recyclable

### Solubility :

Alkyl-Phosphonate ionic liquids have a strong solubility power with sugars such as cellulose, polyols, polysaccharides, etc.

They are also:

- miscible in protic solvents
- immiscible in ketones, ethers, hydrocarbons and chlorinated or fluorinated solvents

SOLVANT	MISCIBILITE
Eau	Miscible
Ethanol	Miscible
Methanol	Miscible
Acétone	Partiellement miscible
Toluène	Immiscible
Hexane	Immiscible
Ether	Immiscible

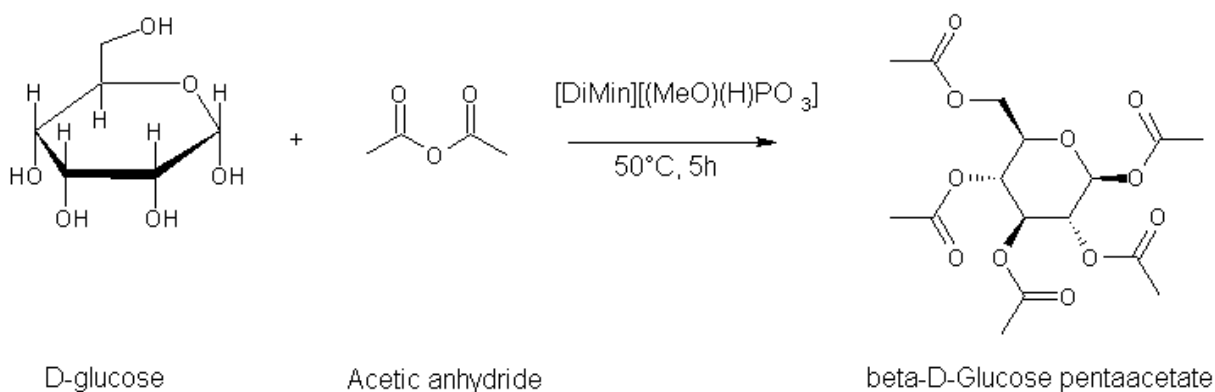
## Applications :

- Solvents for synthesis: Aldolisation, Condensation, Alkylation of cellulose and polyol compounds.
- Solvents for polysaccharides: Purification, Peracetylation of simple sugars, Digestion and Fermentation for alcohols.
- Solvents for aromatic amines.
- Solvents and reagents for catalysis: Dissolution of transition metal salts, Immobilization of nanoparticle catalysts, Complexation with carbene, etc.

## Examples :

### Per-acétylation of a monosaccharide : preparation of pentaacetate glucose

A solution of D-glucose (0.36g; 2mmol) in 1,3-dimethylimidazolium Methyl-Phosphonate (1g) is treated with acetic anhydride (1.02g; 10mmol) at room temperature while being mixed. The reaction is exothermic: the mix becomes homogeneous. After 15 hours at room temperature or 5 hours at 50°C / 122°F, the pentaacetate glucose is precipitated by the addition of water (m = 0.72g; yield = 92%).



### Reaction of Aldolisation : between an aromatic aldehyde and a ketone

In a conventional ionic liquid such as 1-butyl-3-methylimidazolium Hexafluorophosphate (BMiMPF<sub>6</sub>), scientific literature claims the synthesis of hydroxyketone. In the same experimental conditions, the use of the ionic liquid with Alkyl-Phosphonate ([DiMim][(MeO)(H)PO<sub>2</sub>]) quantitatively leads to *trans*-enone. This reaction takes place at room temperature over 4 hours.

