



Review

Supported ionic liquids on non-porous and porous inorganic materials—A topical review

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ABSTRACT

A topical review of the use of non-porous and porous inorganic materials as supports for the immobilization of ILs and their catalytic applications is given. The basic principles and the supports that are being used in various concepts emerging from supported ionic liquids (SILs) including supported ionic liquid films (SILFs), supported ionic liquid catalysis/catalysts (SILC/SILCAs), solid catalysts with ILs (SCILs), solid catalysts with IL layer (SCILL), supported IL nanoparticles (SILnPs) and supported ionic liquid phase (SILP) catalysts (SILPC) are first discussed. In addition, we provide a comprehensive review of the SILs concept dealing with inorganic supports, such as layered silicates, porous glass, zeolites, mesoporous (MCM) and PMO (periodic mesoporous organosilica) materials; and their applications.

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1. Introduction

Ionic liquids (ILs) are traditionally used as solvents in various biphasic ILs-transition metal-catalyzed organic reactions with a view to improve catalyst recycling and/or reuse [1–3]. In recent years, there has been a surge of interest in immobilization of ILs,

the so-called supported ILs (SILs), using various polymeric [4,5] and inorganic supports [6,7] in order to improve their applicability in industrially important catalytic processes. SILs are generally prepared by coating a thin layer of IL film (SILF) onto and/or into the surface of desired solid support materials. Such SILF-based heterogeneous catalyst systems offer several attractive advantages: (i) concomitant use of ILs, (ii) high catalytic activity owing to a uniform distribution of catalytic active species within SILF and (iii) they can be easily separated from the reaction products for further reusability.

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