氯铝酸离子液体中一步法合成乙基二茂铁

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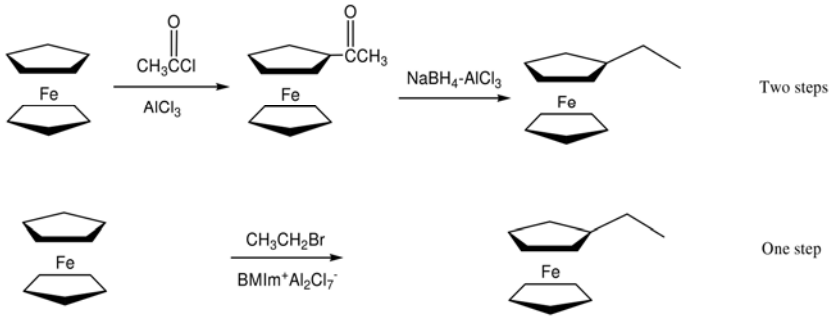
乙基二茂铁是合成二茂铁衍生物的重要中间体, 在航天、制药等领域有着广泛的应用。目前烷基二茂铁的合成主要采用间接法[1]：先进行二茂铁的酰化反应，然后经还原后制得烷基二茂铁（Scheme 1）间接法制备乙基二茂铁步骤多，过程长，而且在还原过程中用到有毒，易爆的危险药品，造成了环境污染。这里，我们以氯铝酸离子液体作为催化剂和溶剂，将二茂铁与卤代烷直接反应进行Friedel-Crafts烷基化反应。氯铝酸离子液体不但可以有效地催化合成乙基二茂铁，而且可以控制副产物的生成，提高了目标产物选择性。在离子液体反应体系中，最优条件下（反应温度60°C，压力3Mpa，反应时间6h），二茂铁的转化率大于80%，目标产物乙基二茂铁的选择性可达到80%。一步法合成乙基二茂铁缩短了反应路线，避免了危险品的使用，从而达到了绿色合成的目的。



Scheme 1 The syntheses of ethylferrocene by different processes

关键词：二茂铁；离子液体；烷基化；Friedel–Crafts 反应，绿色合成

参考文献

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One-step synthesis of ethylferrocene in chloroaluminate ionic liquids

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A direct process for synthesis of ethylferrocene from ferrocene and ethyl bromide in chloroaluminate ionic liquids was described in this work. The chloroaluminate ionic liquids were used as solvents and catalysts for this Friedel–Crafts reaction， which could be effective catalyzed synthesis ethylferrocene by one-step procedure. In this catalytic system, the conversion of ferrocene was up to 80 % and the selectivity of ethylferrocene was 80 % at optimum conditions 60 °C, 3 Mpa, 6 h. One-step synthesis of ethylferrocene using chloroalumiate ionic liquids not only shortens the reaction route, but also avoids the use of harmful chemicals, therefore, this preparation method was expected to provide an effective strategy to progress of green synthesis technology for alkylferrocenes.