Abstract

This study investigates the feasibility to replace concentrated sulfuric acid with ionic liquids as catalysts for esterification process. Synthesis of three ionic liquids: 1-methylimidazolium tetrafluoroborate ($[MIM]^+ BF4^-$), 1-butyl-3-methylimidazolium tetrafluoroborate ($[BMIM]^+ BF4^-$) and 1-butyl-3-methylimidazolium hexafluorophosphate ($[BMIM]^+ PF6^-$) was carried out and the ionic liquids characterized by proton NMR Spectroscopy. The catalytic effect of the ionic liquids on esterification of butanol with ethanoic acid was studied through various means such as percentage conversion after 1 hour of reflux and effect of the mass of catalyst on esterification. The viability of reusing the catalyst was also studied. Finally, the esterification yielding a different ester, pentyl ethanoate, was studied. Results indicate that $[MIM]^+ BF4^-$ has the greatest catalytic effect. 0.3g of $[MIM]^+ BF4^-$ was sufficient to bring about maximum catalytic effect. $[MIM]^+ BF4^-$ could be reused up to 3 cycles without significant loss of catalytic property. The esterification reaction between pentanol and ethanoic acid gave a greater % yield of ester than that between butanol and ethanoic acid after 1 hour. $[MIM]^+ BF4^-$ has the potential to be an alternative catalyst for esterification.