Cellobiose hydrolysis over ion exchange resins: Interaction between the catalysts and halogen-containing ionic liquids on the enhancement of glucose formation

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In the present study, we focused on understanding the interaction between ion exchange resin catalysts (Amberlyst, Nafion, Dowex) and 1-butyl-3-methylimidazolium chloride ([bmim]Cl) in hydrolysis of cellobiose. It was found that the presence of [bmim]Cl increased the glucose formation. As the [bmim]Cl/H+ ratio increased up to approximately 1.0, the glucose/H+ values obtained at the catalyst loadings of 0.1 and 0.2 g were linearly raised to about 7.7 and 5.2, respectively. These values remained unchanged by increasing the [bmim]Cl/H+ ratio up to 10. Afterwards, we extended our study on the halogen-containing ionic liquids (ILs). Surprisingly, the above-mentioned effect obtained by addition [bmim]Cl was observed as well in the case of halogen-based ILs. This observation was believed to be caused by the interaction between the ILs and acidic terminal –SO3H resulting in the release of additional proton.