Investigation of the relationship between ionic liquid structure and its activity for electrochemical reduction of carbon dioxide

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Since imidazolium ionic liquids (ILs) were discovered to significantly reduce overpotential for electrochemical reduction of CO_2 and suppress hydrogen evolution reaction (HER) [1], numerous attempts to clarify the mechanism of the co-catalytic activity were made [2-4]. We approach this problem from synthetic point of view, synthesizing ILs of different structures (e.g. side chains functionalities, heterocyclic backbones, heteroatoms variations) and establishing the change of their co-catalytic performance (see [5]). Some of ILs being synthesized possess much higher activity compared to the classical imidazolium ones, and some are found to exhibit higher stability. Therefore, usage of ILs provides a tunable and promising option for electrochemical reduction of CO_2.

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