Bifunctional Pt-Si Alloys for Small Organic Molecule Electro-oxidation

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Designing highly active catalysts for electro-oxidation of small organic molecules can help to reduce the anodic overpotential for more efficient utilization of hydrocarbon fuels. The challenge in developing more active electrocatalysts for electro-oxidation reactions is to satisfy the stringent bifunctional requirement, which demands both adsorption and water oxidation sites. In this contribution, we explore the possibility of using Pt-Si alloys to fulfill this bifunctional requirement. Silicon, a highly oxophillic element, is alloyed into Pt as a site for water oxidation, while Pt serves as a CO adsorption site. We will discuss the enhanced activity of Pt-Si alloys for small organic molecule oxidation, which can be attributed to the improved CO electro-oxidation kinetics on Pt-Si.

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