

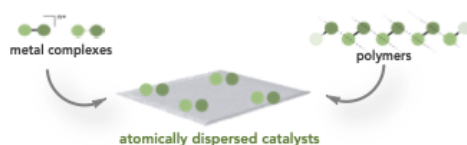
Defined precursors for atomically dispersed catalysts

R. J. Somerville¹, J. -. Schmidt¹, K. A. Abhyankar¹, P. J. Dyson^{1*}

¹Institut des Sciences et Ingénierie Chimiques (ISIC), Ecole Polytechnique Fédérale de Lausanne (EPFL), 1015 Lausanne, Switzerland

Atomically dispersed single, double, and cluster catalysts are a class of catalyst that merges the separability of heterogeneous catalysts with the single-site nature and tunability of homogeneous catalysts.^{[1],[2]} However, the synthesis of atomically dispersed catalysts can be challenging, especially when attempting to control the formation of heterobimetallic or mixed-metal sites.^[3]

Here, heterogeneous catalyst design and synthesis is linked with techniques from coordination chemistry to develop routes to install dispersed metal atom sites on support materials.



Mixed palladium-platinum complexes were synthesised and a range of techniques investigated to disperse the PdPt sites across support materials. This resulted in mixed clusters and discrete double atom sites. These features were investigated by high resolution STEM. The catalysts were assessed in Csp²-O and Csp²-F hydrogenolysis, and electrochemical reactions.

[1] Selina K. Kaiser, Zupeng Chen, Dario Faust Akl, Sharon Mitchell, Javier Pérez-Ramírez, *Chem. Rev.* **2020**, *120*, 11703-11809

[2] Xiao Liang, Ninghua Fu, Shuangchao Yao, Zhi Li, Yadong Li, *J. Am. Chem. Soc.*, **2022** *144*, 18155-18174.

[3] Sharon Mitchell, Javier Pérez-Ramírez, *Nat. Rev. Mater.* **2021**, *6*, 969-985.