

POP-Osmium Polyhydrides in Chemical Hydrogen Storage

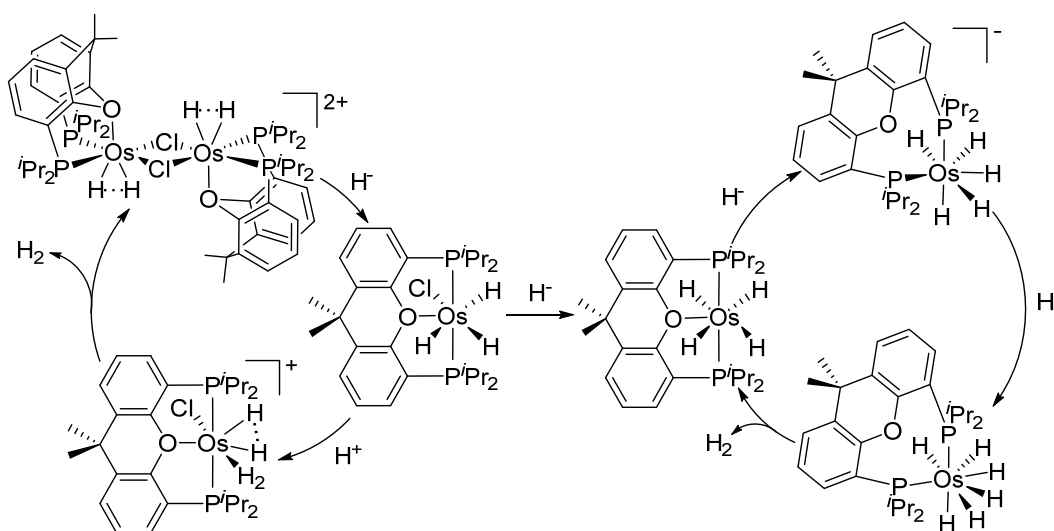
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The ever-increasing demand for energy worldwide means that new and economically sustainable energy sources are urgently required. Molecular hydrogen could be a good alternative to replace fossil fuels due to its energy content per unit mass and availability, although problems concerning transport and handling of this low density and highly diffusible gas have to be resolved first. In this regard, recent advances in chemical hydrogen storage methods offer new possibilities in this field.[1]

Osmium polyhydrides have shown their versatility to act in both various catalytic reactions and in the activation of C-H, N-H, C-N, B-H or H-H bonds, amongst others.[2] In the field of hydrogen storage, catalytic dehydrogenation of amine-borane has been achieved using the unsaturated dihydride complex $\text{OsH}_2(\text{CO})(\text{P}^i\text{Pr}_2)_2$. [3] We have recently found that the flexibility of a POP pincer ligand allows the stabilization of osmium polyhydride species in which different stages in the activation of H-H and B-H bonds have been fully identified,[4] and show their ability to generate molecular hydrogen in a kinetically controlled cyclic manner (Figure).

Herein we present our recent results in the field of hydrogen storage and production using POP Os-polyhydrides as catalyst.



References

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