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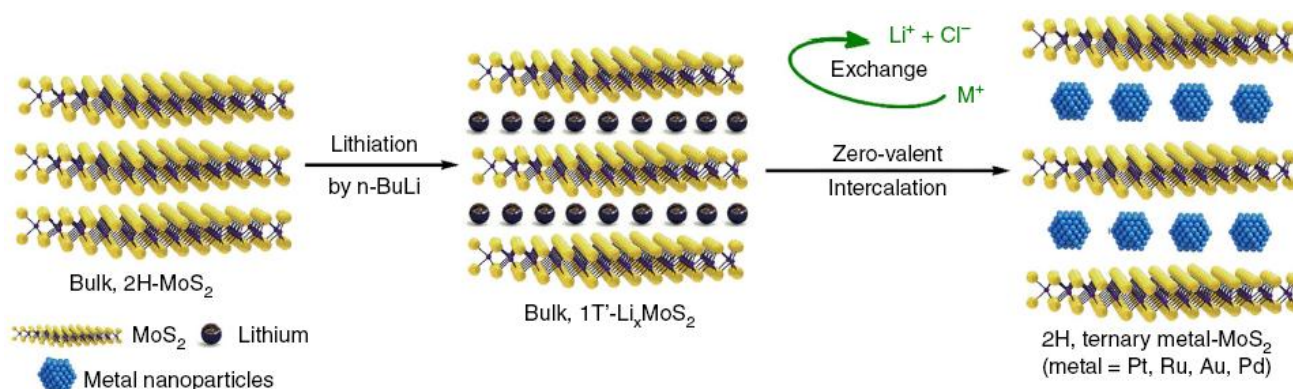
## Interface Confined Hydrogen Evolution Reaction in Zero Valent Metal Nanoparticles-Intercalated Molybdenum Disulfide

Interface confined reactions, which can modulate the bonding of reactants with catalytic centres and influence the rate of the mass transport from bulk solution, have emerged as a viable strategy for achieving highly stable and selective catalysis. Here we demonstrate that 1T'-enriched lithiated molybdenum disulfide is a highly powerful reducing agent, which can be exploited for the in-situ reduction of metal ions within the inner planes of lithiated molybdenum disulfide to form a zero valent metal-intercalated molybdenum disulfide. [1] The confinement of platinum nanoparticles within the molybdenum disulfide layered structure leads to enhanced hydrogen evolution reaction activity and stability compared to catalysts dispersed on carbon support. In particular, the inner platinum surface is accessible to charged species like proton and metal ions, while blocking poisoning by larger sized pollutants or neutral molecules. This points a way forward for using bulk intercalated compounds for energy related applications.

### References

- [1] Zhongxin Chen,† Kian Leng,† Xiaoxu Zhao, Souradip Malkhandi, Wei Tang, Bingbing Tian, Lirong Zheng, Boon Siang Yeo and Kian Ping Loh\*, Nature Communications, 8 (2017), 14548.

### Figures



**Figure 1:** Zero-valent intercalation of metal nanoparticles by an in-situ reduction strategy.