

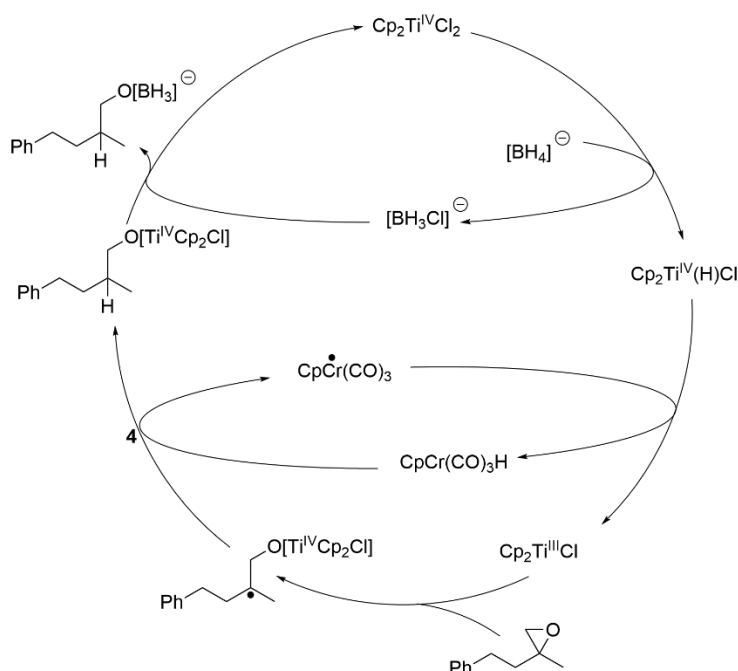
# Cooperative Catalysis of Titanocene and chromium-catalysts using $[\text{BH}_4]^-$ as hydrogen atom source.<sup>[1]</sup>

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A great way of applying the general concepts of green chemistry onto the epoxide opening presented by A. Gansäuer is the efficient coupling of Ti- and Cr catalysis in a reaction that allows  $[\text{BH}_4]^-$  as stoichiometric hydrogen atom and electron source.<sup>[1]</sup>



**Figure 1:** "Catalysis globe" obtained by coupling of orthogonal catalytic cycles.<sup>[1]</sup>

The most significant step in the process is the unprecedented transfer of a hydrogen atom from  $[\text{BH}_4]^-$  to chromium via a titanocene hydride species.<sup>[1]</sup> The transferred hydride is then formally divided into an electron and a hydrogen atom, generating the active chromium hydride species as well as the active titanocene(III) species.<sup>[1]</sup> Subsequently, both the electron and the hydrogen atom is transferred to the substrate by the respective catalyst.<sup>[1]</sup>

[1] Michael Heinz, Gregor Weiss, Dr. Grigoriy Shizgal, Dr. Anastasia Panfilova, Prof. Dr. Andreas Gansäuer, *Angew. Int. Ed.*, **2023**, 62, e202308680.