# f-ELEMENT COMPLEXES WITH SOFT NEUTRAL DONOR GROUPS

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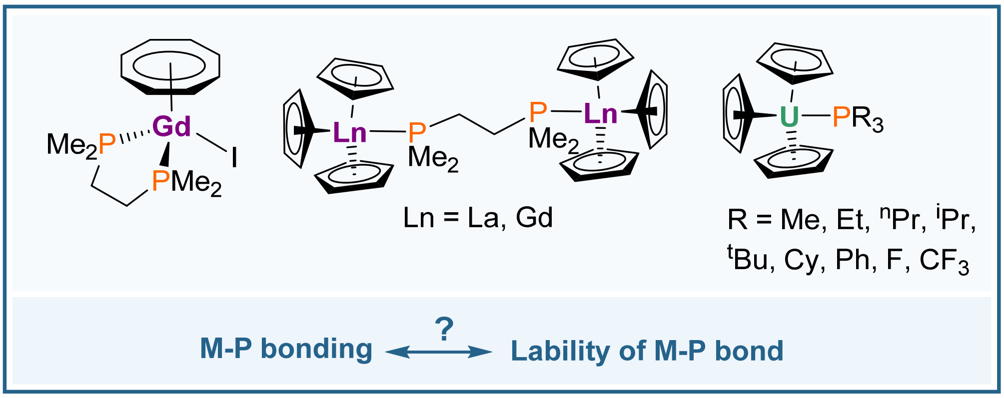
In the coordination chemistry of the f-elements, the majority of ligands used contain hard and anionic donor groups to stabilise both lanthanoid and actinoid complexes. This can be rationalised by the hard soft acid base (HSAB) principle, according to which the f-element ions are classified as hard Lewis acids. A few reports, however, have demonstrated that softer and neutral donor groups can lead to novel reactivities or could be used to tune the properties of f-element complexes [1, 2]. Despite these promising findings, these donor groups have been largely neglected, as they can be highly labile, especially as monodentate ligands. Thus, only little is known about the bonding between f-elements and neutral, soft donors and how this influences the properties and reactivities of these complexes.

To gain better insights into this ligand class, we are therefore investigating f-element complexes with soft neutral donor groups to study their properties, bonding and reactivity. Employing a donor-solvent-free synthetic route, we could isolate the first gadolinium complexes with neutral phosphine ligands, as well as their lanthanum congeners [3]. Despite the structural similarities, slight differences were found in the Ln-P bonding. Similarly, trends in the U-P bonding for a series of [$Cp_3U(PR_3)$] were found [4] and the interplay of bonding and bond lability was elucidated [5].



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