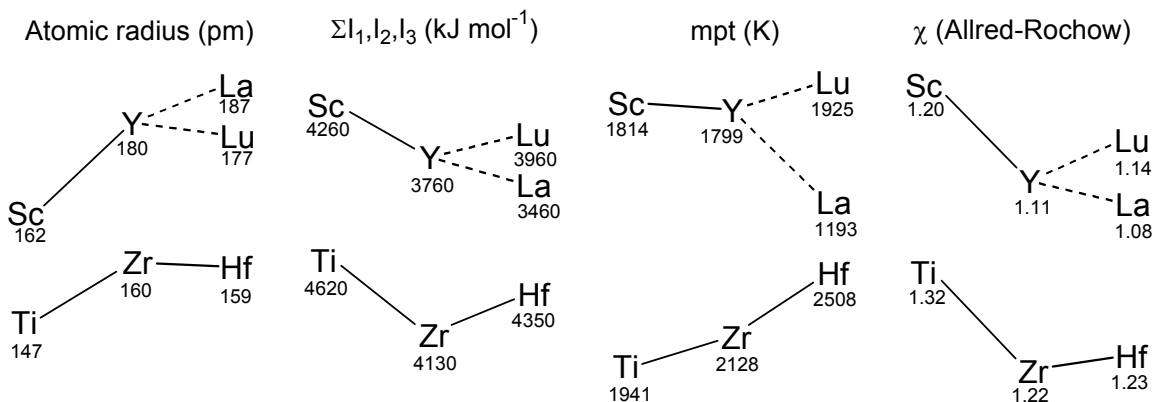


# Group 3: Yttrium and Lutetium (& Lawrencium)

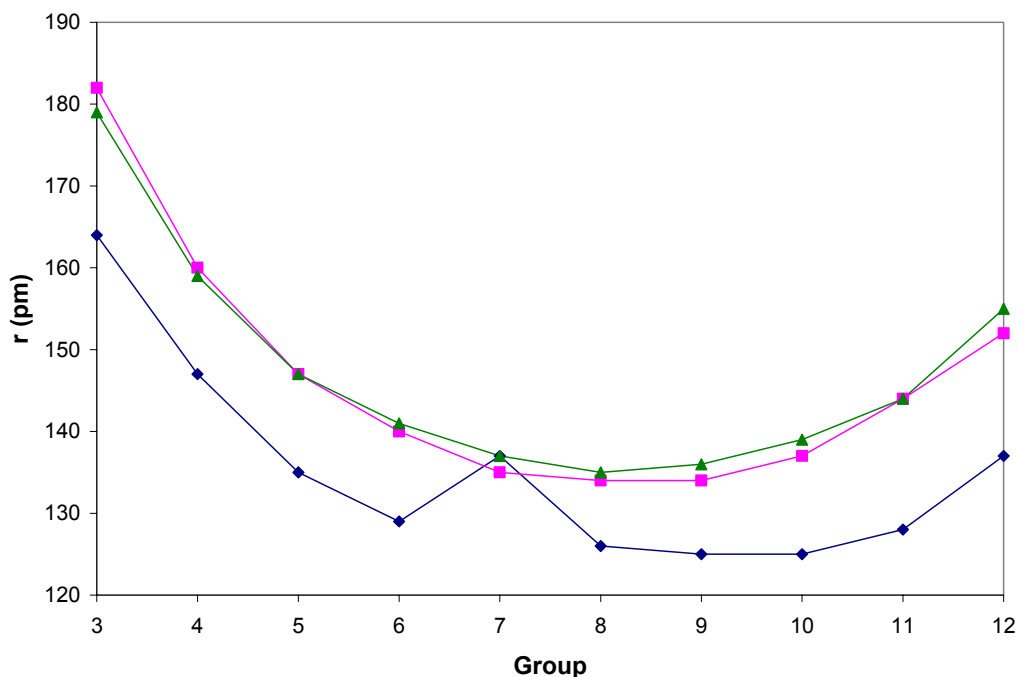


**Figure 3.1** Periodic Trends, La vs. Lu



**Table 3.1.** Representative hard, intermediate and soft ligands and metals.

	Ligands	Metals
<b>Hard</b>	F <sup>-</sup> , Cl <sup>-</sup> , H <sub>2</sub> O, NH <sub>3</sub>	Na <sup>+</sup> , K <sup>+</sup> , Y <sup>3+</sup> , Ln <sup>3+</sup> , Al <sup>3+</sup> , Fe <sup>3+</sup> , Co <sup>3+</sup>
<b>Intermediate</b>	Br <sup>-</sup> , pyridine	Fe <sup>2+</sup> , Co <sup>2+</sup> , Ni <sup>2+</sup>
<b>Soft</b>	I <sup>-</sup> , H <sup>-</sup> , CN <sup>-</sup> , CO, R <sub>3</sub> P, $\pi$ -acceptors	M <sup>0</sup> , Pd <sup>2+</sup> , Pt <sup>2+</sup>



**Figure 3.2.** Metallic radii of the d-block elements