

• Introduction:- The f-block elements appear in two series characterized by the filling of 4f and 5f orbitals in the respective third inner principal quantum level from outermost. The first series contains the 14 elements Cerium to Lutetium ($Z=58-71$) and are called lanthanides as they appear after lanthanum; the second series (thorium to lawrencium, $Z=90-103$) appears after actinium and are called actinides. The scandium group elements (Group IIIA or 3) Sc, Y and La are formally part of the d-block (outer electron configuration $(n-1)d^1 ns^2$ but they lack the common features of d-block elements in showing a single stable oxidation state III and closely resemble the lanthanides. Yttrium and lanthanum also occur with the lanthanides and the 16 elements together are called the rare earth elements. These elements resemble one another much more closely than do the elements in any d-series. The actinide elements, however, differ appreciably in their individual chemistry.

• Electron configuration:-

Element	Outer electron configuration	
	Ground state atom	M^{3+} ion
57 La	$[Xe] 5d^1 6s^2$	$4f^0$
58 Ce	$[Xe] 4f^1 5d^1 6s^2$	$4f^1$
59 Pr	$[Xe] 4f^3 6s^2$	$4f^2$
60 Nd	$[Xe] 4f^4 6s^2$	$4f^3$
61 Pm	$[Xe] 4f^5 6s^2$	$4f^4$
62 Sm	$[Xe] 4f^6 6s^2$	$4f^5$
63 Eu	$[Xe] 4f^7 6s^2$	$4f^6$
64 Gd	$[Xe] 4f^7 5d^1 6s^2$	$4f^7$
65 Tb	$[Xe] 4f^9 6s^2$	$4f^8$
66 Dy	$[Xe] 4f^{10} 6s^2$	$4f^9$
67 Ho	$[Xe] 4f^{11} 6s^2$	$4f^{10}$
68 Er	$[Xe] 4f^{12} 6s^2$	$4f^{11}$
69 Tm	$[Xe] 4f^{13} 6s^2$	$4f^{12}$
70 Yb	$[Xe] 4f^{14} 6s^2$	$4f^{13}$
71 Lu	$[Xe] 4f^{14} 5d^1 6s^2$	$4f^{14}$