Group 3 / IIIB; Lanthanides

or "Rare Earths"

- Lanthanides are also called "rare earth". They are not really rare just hard to produce, and the present-day monopoly of China has exercised the media quite a bit. That's because the appear in many high-tech uses and are thus important for the well-being of industrialized countries.
  - Lanthanides are chemically very similar because they all look the same to outsiders - their outermost electron configuration is identical.
- Actinides are evil elements and that's why we are going to ignore them
- *Table of Basic Data*

Basics

Name *(German)*	**Lanthanum La** *Lanthan*	**Cerium Ce** *Cer*	**Praseodymium Pr** *Praseodym*	**Neodymium Nd** *Neodym*	**Promethium Pr** *Promethium*	**Samarium Sa** *Samarium*	**Europium Eu** *Europium*	**Gadolinium Gd** *Gadolinium*	**Terbium Tb** *Terbium*	**Dysprosium Dy** *Dysprosium*	**Holmium Ho** *Holmium*	**Erbium Er** *Erbium*	**Thulium Tm** *Thulium*	**Ytterbium Yb** *Ytterbium*	**Lutetium Lu** *Lutetium*
Atomic number	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Atomic mass [u]	138,9	140,1	140,9	144,2	146,9	150,3	151,25	157,2	158,9	162,5	164,9	167,2	168,9	173	174,9
Melting point [K]	1193	1069	1204	1283	1353	1345	1095	1584	1633	1682	1743	1795	1818	1097	1929
Melting point [°C]	920	796	931	1010	1080	1072	822	1311	1360	1409	1470	1522	1545	824	1656
Melting point [°F]	1688	1464	1708	1850	1976	1962	1512	2392	2480	2568	2678	2772	2813	1515	3013
Boiling point [K]															3675
Density [g/cm^3]	6,16	6,77	6,48	7,00	7,22	7,54	5,25	7,89	8,25	8,56	8,78	9,05	9,32	6,97	9,84
Ionization energy [eV]	5,57	5,47	5,42	5,49	5,55	5,63	5,67	6,14	5,85	5,93	6,02	6,10	6,18	6,25	5,42
Electronegativitiy															1,27
Atomic radius [pm]															1.74
Ionic radius [pm]															
Oxidation numbers															3
Lattice typ Transformation temp. [°C]															
Lattice constant [Å] (a or c)															
Young's - Modulus [GPa]															69
Therm. expansion coefficient α [10^{-6}K^{-1}]															

- In case of doubt all numbers are for room temperatures
- fcc = face centered cubic; lattice const. = a
  bcc = body centered cubic
  sc = simple cubic
  hp = simple hexagonal
  hcp = hexagonal close packed; lattice constants a and c.
  op = simple orthorhombic, monoclinic, triclinic
  tp = simple tetragonal
  dia = diamond structure
  r = trigonal or rhomboedral trigonal