

ICOSAHERAL 312 ARRANGEMENTS IN YB66 AND YE42Si1.27

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In the present conference, we will speak about uniqueness of icosahedral 312 structure of the title compounds. The YB66 structure is basically constructed with the (B12)13-super-icosahedron, which centers at the corners of octants of the face-centered cubic unit cell having the lattice constant $a = 23.4364(6)$ Å. The relatively large hole at the center of the octant is filled with an irregularly shaped boron cluster consisting of 42 atoms, and smaller holes are filled with Y atoms. The compound YR42Si1.2 is a new compound of new structure-type, which has recently been prepared and the structure determined by us. The structure of this compound is made up of the B12 icosahedron and B12Si3 icosihexahedron (26-hedron). The crystal system is orthorhombic (space group: Pbam) with the lattice constants $a = 16.674(1)$, $b = 17.667(1)$, $c = 9.511(7)$ Å. By analogy with the B66-structure, the complicated boron-framework is interpreted by use of newly suggested polyhedral cluster, (B12)9(B12Si3)4-giant icosahedron, which corresponds to the (B12)13-super-icosahedron in YB66.