MM 8 Symposium Complex Metallic Alloys, Hauptvortrag Esther Belin-Ferré

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Electronic structure of Frank-Kasper Al-Mg based compounds

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In the Al-Mg Frank-Kasper system, the stable crystalline β-Al_3Mg_2 compound possesses a large cubic unit cell decorated with a complex packing of tetrahedral and icosahedral clusters. Furthermore, quasiperiodic compounds are found in the Al-Mg as well as Al-Mg-Zn systems. The electronic structure of these complex intermetallic compounds was investigated using X-ray emission and X-ray photoabsorption spectroscopy techniques, which allow us to describe separately the energy distribution of occupied and unoccupied states around Al and (or) Mg elements in the solid. The data are averaged over the various Al and (or) Mg sites. The paper will report and discuss these spectroscopic data with emphasis put on the β-Al_3Mg_2 compound. In this compound, the Al and Mg electronic distributions depart from that in the pure Al and Mg metals. A faint pseudo-gap is found at the Fermi level, indicating that in spite of its complex atomic structure, β-Al_3Mg_2 still retains metallic character.