TEMPERATURE AND PRESSURE INDUCED PHASE TRANSITION IN $RENi_2$ (RE = RARE EARTH)

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In the temperature dependence of the transport phenomena [1] and the thermal expansion anomalies has been observed at high temperatures. High temperature X- ray diffraction revealed that these anomalies are caused by a structural instability. The $RENi_2$ compounds crystallize in a superstructure of the cubic Laves phase ($MgCu_2$ - type structure) at room temperature. This structure with the space group F-43m is characterized by vacancies with a periodic arrangement within the normal Laves phase unit cell [2]. The transition from the superstructure into the Laves phase takes place at 690K in YNi_2, at 680K in $GdNi_2$ and at 550K in $SmNi_2$. Very recently performed pressure experiments at DESY confirmed that at pressures higher than 20 GPa the Laves phase could be stabilized at room temperature.

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[2] M.Latroche, V. Paul-Boncour and A.Percheron-Guegan, Zeitschrift für Physikalische Chemie 179 (1993), 261