Several different phases can be found in NdFeB magnets. Usually the phi boride (Nd2Fe14B) is the most significant, and also the eta boride Nd1.1Fe4B4. Hexagonal Neodymium (Space Group =194) also can be found. However, impurity phases can also be present, as for example the alpha-iron phase (bcc). As the formation of Nd2Fe14B is the peritectic, slow cooling leads to formation of primary gamma iron (fcc), which subsequently transforms into alpha-iron, a deleterious phase for sintered magnets. Some intermetallic phases may also appear during solidification, as for example cubic NdFe2 (SG=227) or Nd3Fe (monoclinic SG=62, the same structure of cementite Fe3C). Heat treatments for elimination of the alpha iron phase are discussed. A heat treatment during 2 days at 1020°C is sufficient for disappearing the alpha iron.