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(71) Applicant: **Höganäs AB**
263 83 Höganäs (SE)

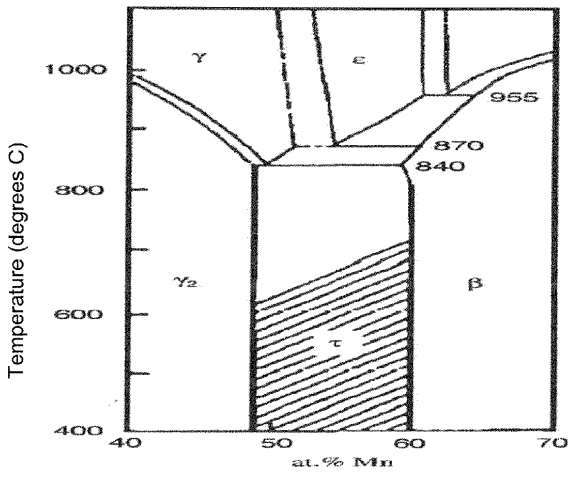
(72) Inventors:
- **SKARMAN, Björn**
  26333 Höganäs (SE)
- **HÄGGBLAD SAHLBERG, Martin**
  75752 Uppsala (SE)
- **HAILIANG, Fang**
  75220 Uppsala (SE)

(74) Representative: **Hoffmann Eitle**
Patent- und Rechtsanwälte PartmbB
Arabellastraße 30
81925 München (DE)

(54) MNAL ALLOY, PARTICLES THEREOF, AND METHOD FOR PRODUCTION

(57) The present invention relates to an alloy represented by the formula $(Mn_xAly)C_z$, the alloy consisting of aluminum (Al), manganese (Mn), and carbon (C), and optionally unavoidable impurities; wherein x = 56.0 to 59.0 y = 41.0 to 44.0 x + y = 100, and z = 1.5 to 2.4. The alloy is highly suitable for forming the ε and τ phase in high purity and high microstructural homogeneity. The present invention further relates to a method for processing an alloy of formula $(Mn_{x'}A)_{y'})C_{z'}$, wherein x' = 52.0 to 59.0, y' = 41.0 to 48.0, x' + y' = 100, and z' = 0.1 to 3.0, the process comprising one or more of the steps a. providing the raw materials of the alloy, melting the raw materials, and forming particles of the alloy by gas atomization of the molten alloy; b. performing a heat treatment on the alloy at 900 - 1200 °C; c. milling the alloy represented by formula (II) at a temperature of - 20°C or below, preferably -100°C or lower, further preferably -150°C or lower; and/or d. performing a heat treatment on particles of the alloy represented by formula (II) at a temperature of 900 to 1000°C for a time of 0.5 to 20 minutes, preferably 5 to 15 minutes. Each of these process steps, separately and in combination, facilitate the formation of an alloy having high phase purity and allows obtaining an MnAl alloy having improved magnetic properties.

Figure 1: Phase Diagram



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