

## The Effect of Ce Doping on the Magnetic Properties of NdFe<sub>11</sub>Ti Alloys

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**Abstract :** The studied alloys exhibit good magnetic properties that attract the interest of future research, which could lead to their commercial and industrial applications. The investigation of the structure and magnetic properties of (Nd<sub>1-x</sub>Ce<sub>x</sub>) Fe<sub>11</sub>Ti alloys revealed that Ce doping has an effect on the structure and magnetic properties of the alloys after the arc-melting process. The main phase of the processed alloys are compounds with ThMn<sub>12</sub>-type structures (I4/mmm). After smelting (as cast), the main phases resulted in volume fractions of 74 - 80 vol.% and an average grain size of 100 - 150 nm. The volume of the unit cell is nearly the same by a unit difference with impurities as the remaining phase. Where the values that do not exceed 10 - 15 vol.% of the composition of the alloy. The phase structure inhomogeneity (crystalline multiphase state and dendritic segregation) of the alloys in the cast state is explained as the result of a change in hysteresis properties.

**Keywords :** magnetic properties, structure, (Nd<sub>1-x</sub>Ce<sub>x</sub>) Fe<sub>11</sub>Ti, ThMn<sub>12</sub>-type structure (I4/mmm), hysteresis properties, arc-melting

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