

HYDROGEN IN LANTHAN-NICKEL STORE ALLOYS

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It is common knowledge that hydrides are the sources of pure hydrogen necessary for various technologies, engineering and for research purposes. The store of hydrogen in bound state are practically infinite.

The multicomponent composition of hydride systems makes possible the creation of stores with controlled content of hydrogen. The systematic study of hydrides could give new practical implementation. The lanthan-nickel systems based on LaNi_5 alloy hold much promise along this line. In LaNi_5 alloy the lanthan atoms could be partially substituted by atoms of rare-earth metals $R=\text{Nd, Pr, Sm, Er, Y, Gd}$ and nickel atoms by atoms of metals $\text{Me}=\text{Al, Cu, Fe, Mn, Si}$. Such additions can stabilize the structure, increase the hydrogen absorptivity, reduce the material cost.

The theory of hydrogen solubility in alloys of D2d structure of CaZn_5 type (LaNi_5 alloy and this alloys with impurities has such structure) have been worked out in present paper. The thermodynamic potential of the system have been evaluated on the assumption that hydrogen atoms are located in interstitial sites of two types. The equilibrium state equation determined the P-T-c diagram have been found. The isothermals and isopleths of hydrogen solubility have been investigated. We have defined the parameters influenced on the character of their functional dependences, on their level, slope and non-linearity. It has been elucidated the effect of metals impurities on the run of isothermals. The possibility for hydrogen accumulation in investigated systems is accounted.

The calculation results have been compared with experimental data for hydrogen solubility in binary LaNi_5 , LaCu_5 , LaCo_5 alloys and various ternary phases of examined structure.

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