

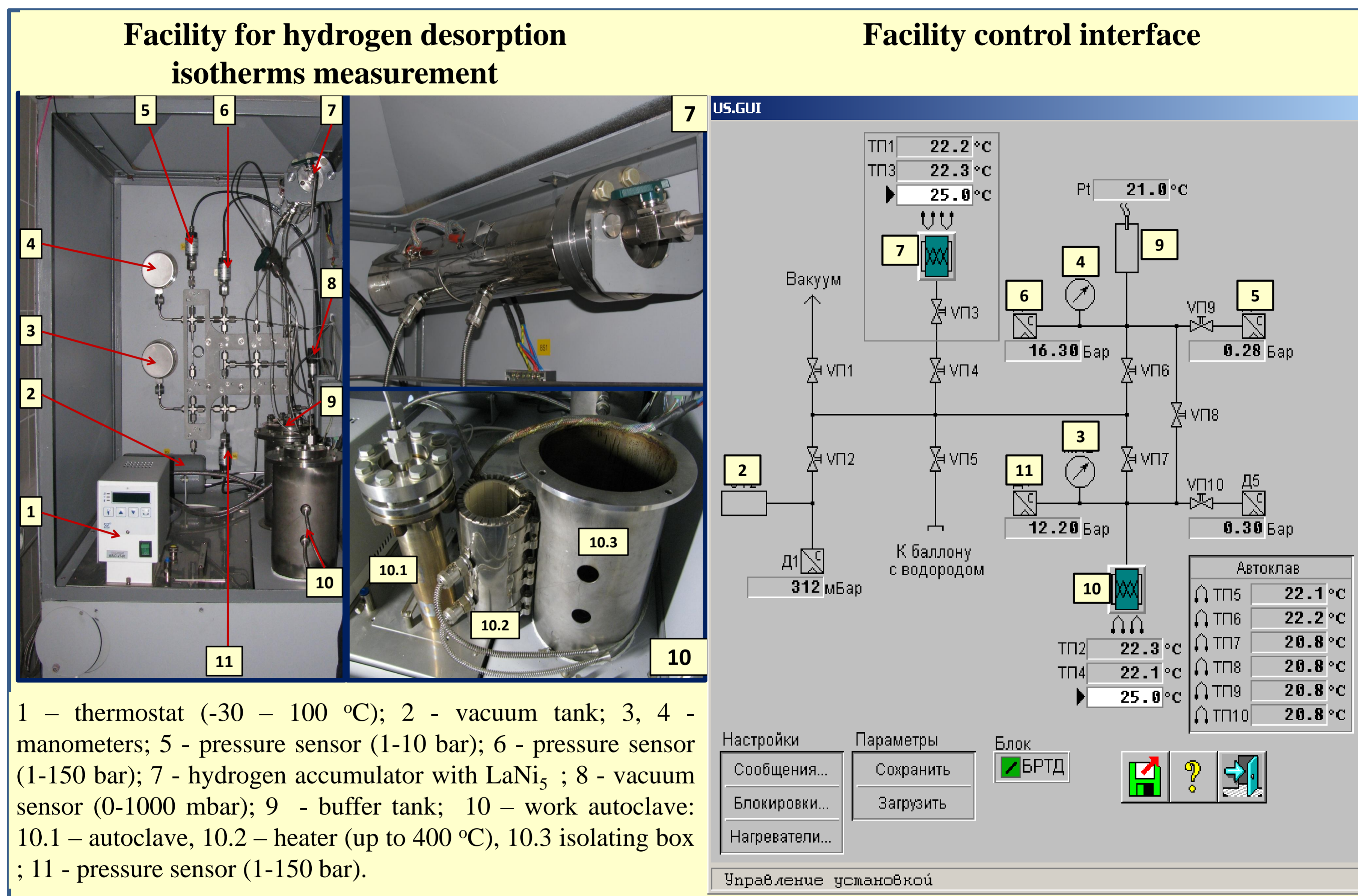
# Scale effect in hydrogen storage systems

Malysenko S.P., Romanov I.A.

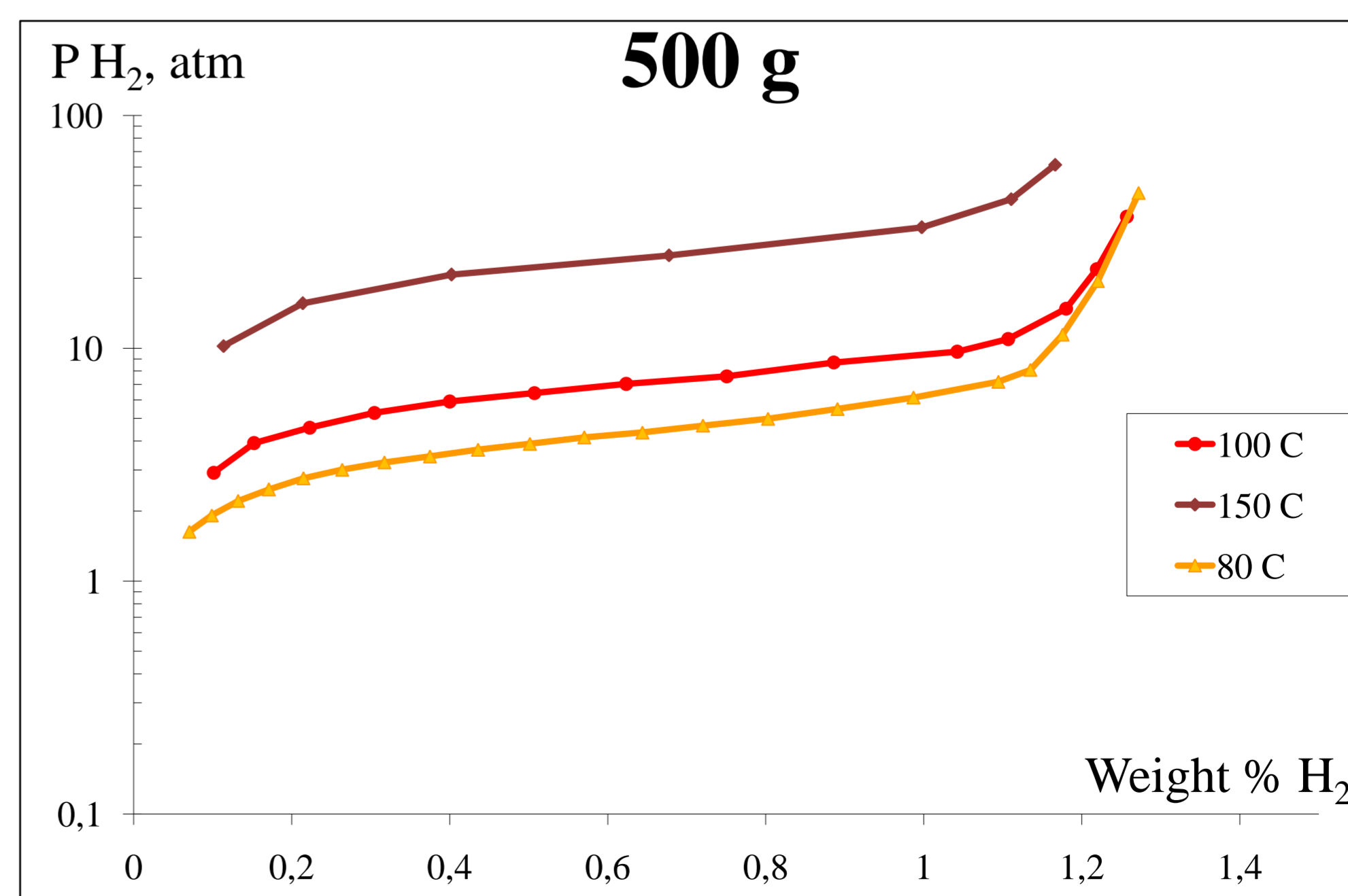
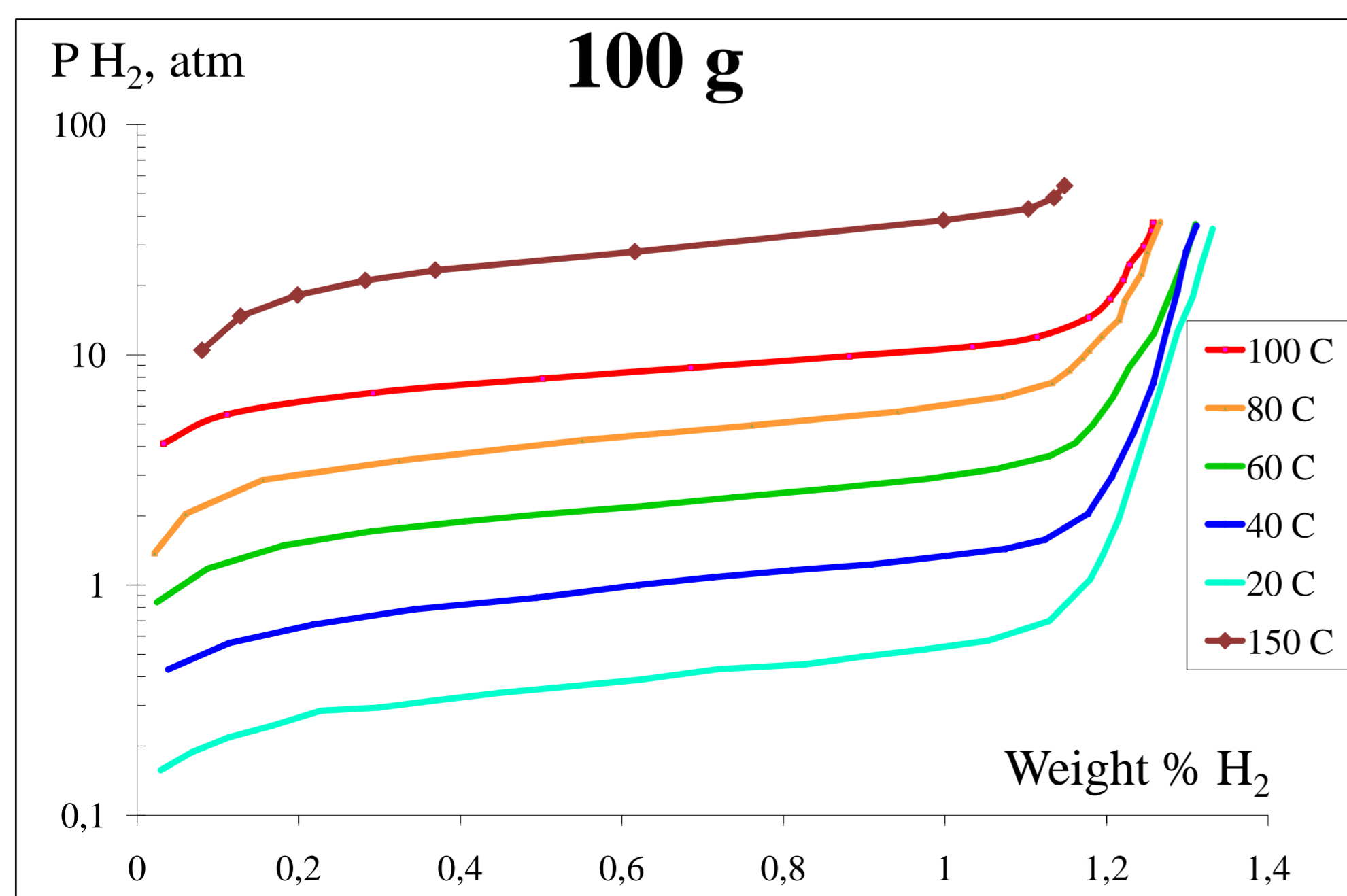
JIHT RAS

h2lab@mail.ru

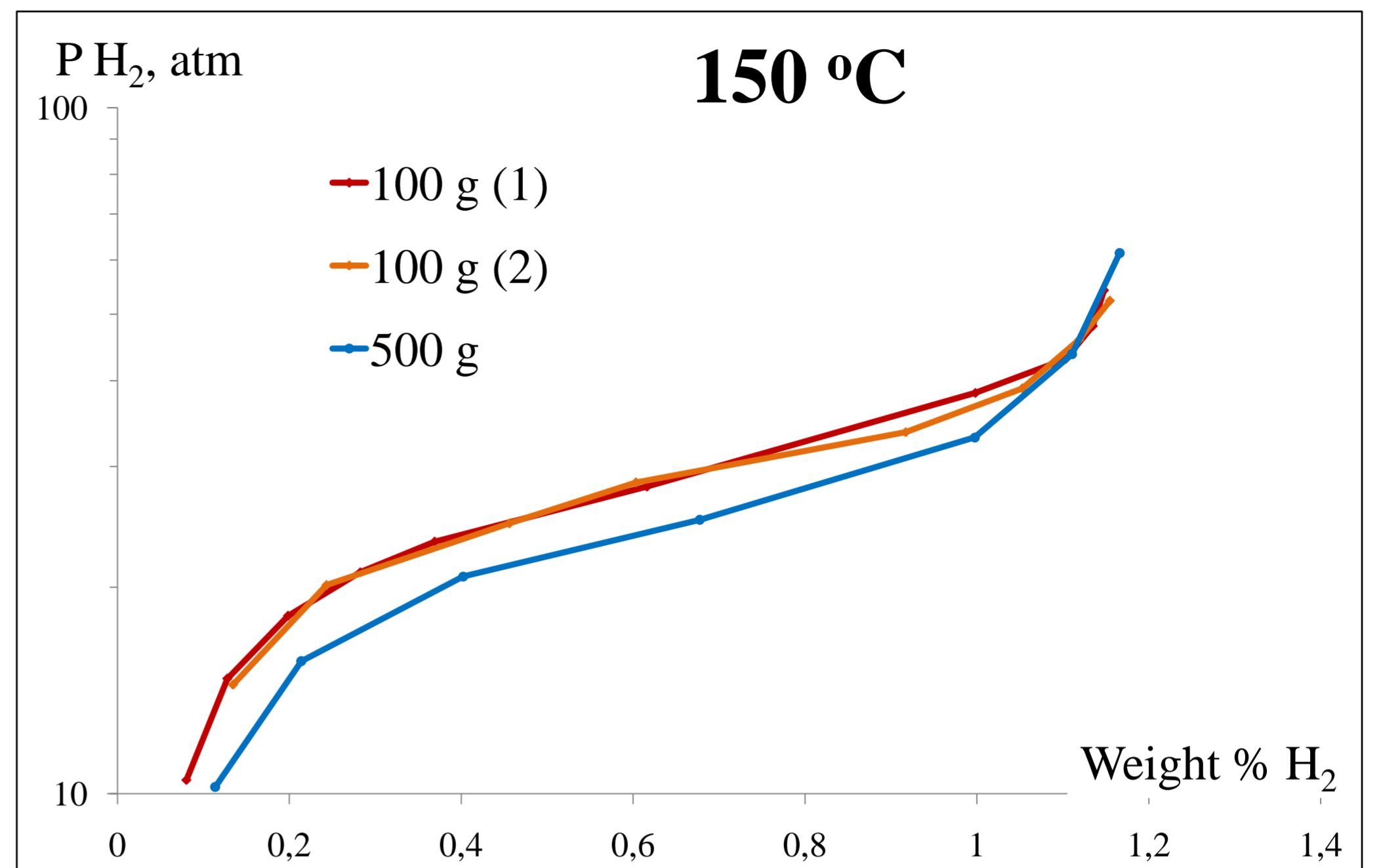
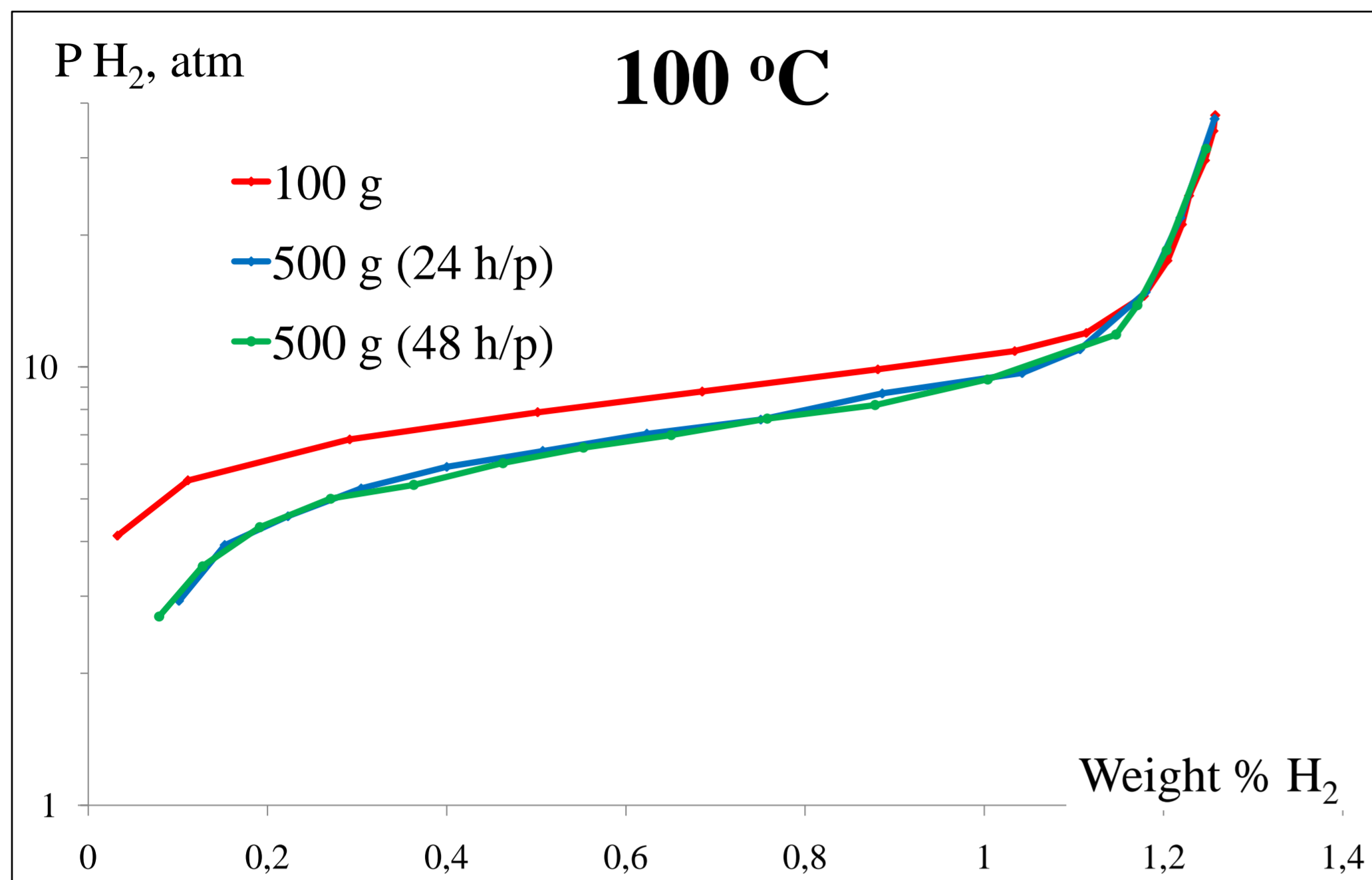
This research is devoted to experimental investigation of hydrogen-alloy system scale influence on hydrogen sorption characteristics (scale effect). We suppose that changing of the alloy cell volume during hydrogen sorption or desorption lead to stress state of the alloy/hydride lattice. In the big scale systems inside the bulk reciprocal influence of particles inhibit the lattice relaxation. These processes effect on thermodynamical characteristics of hydrogen sorption and desorption.



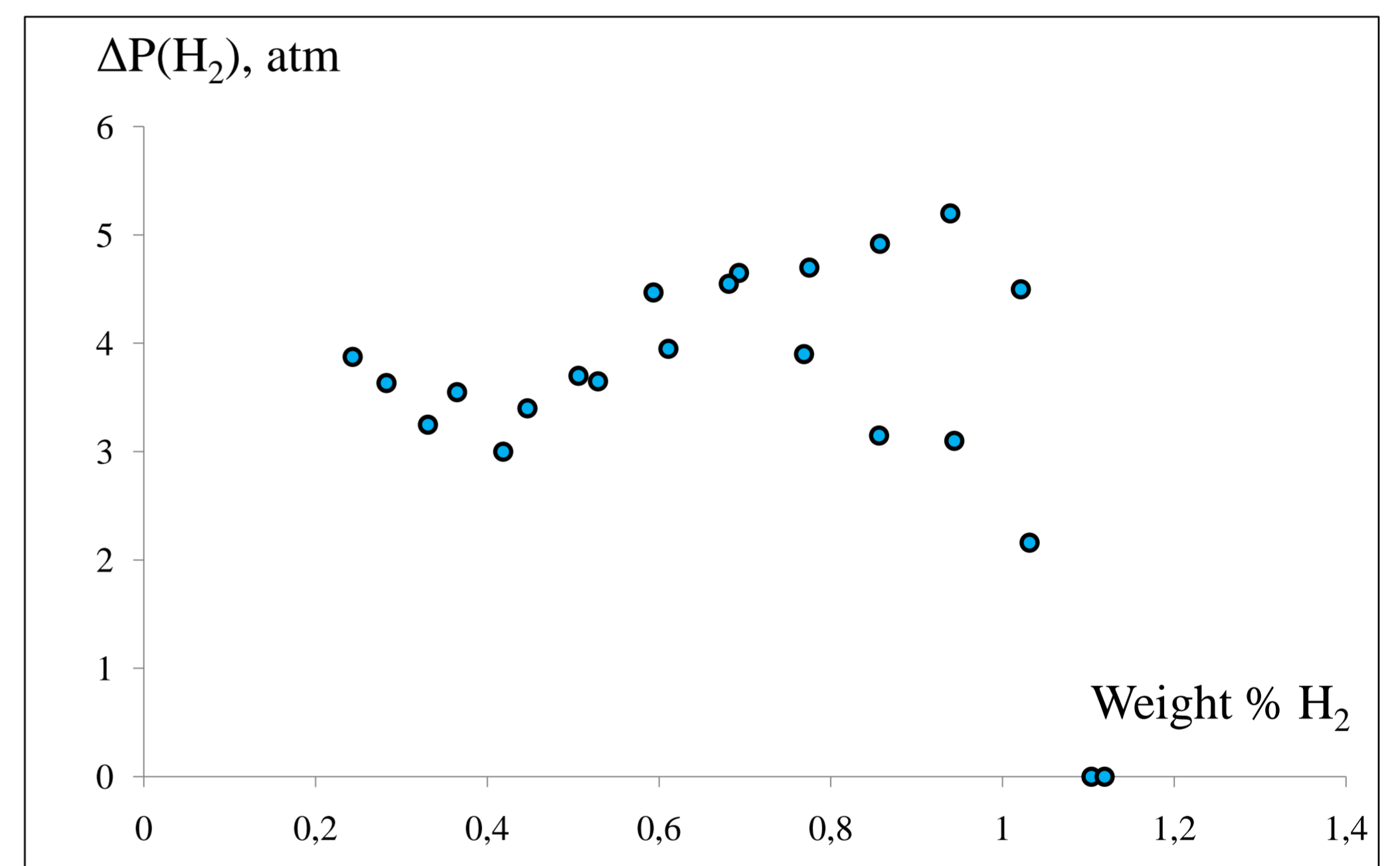
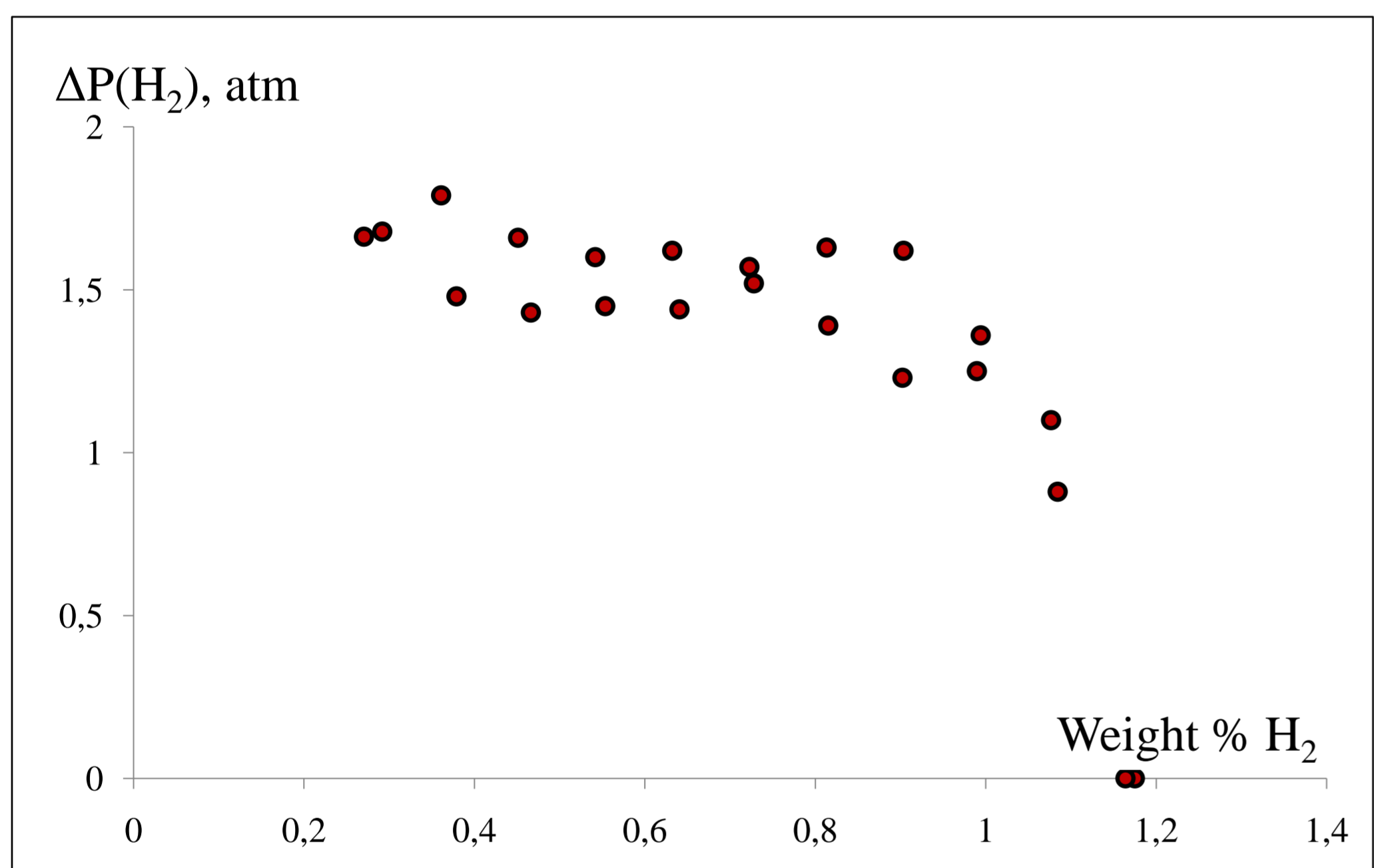
Alloy LaFe<sub>0.1</sub>Mn<sub>0.3</sub>Ni<sub>4.8</sub> is chosen as an object of research in this work. The research of hydrogen sorption characteristics is conducted by measurement of hydrogen desorption isotherms of different scale samples (100 and 500 g) according to the Sieverts method.



# Scale effect in hydrogen storage systems



Marked influence of sample's size on its sorption characteristics is discovered. Measurement of desorption isotherms with different point equilibrium time (24 or 48 hours per point) shows that kinetic factors do not effect on 500 g sample behavior. The experimental data allows us to suppose that changing of sample scale effect on phase of hydrogen solid solution.



During removal of 500 g sample from work autoclave aggregates of the alloy particles have been found. In 100 g sample such aggregates have not been found just fine-dispersed powder.