Measurement of small hydrogen sorption quantities by the Sievert's method

INTRODUCTION

With the recent advances in solid state research and the development of new synthesis paths, only small amounts of material are produced. To investigate the sorption properties of these small samples an accurate tool for measurement is required. The GASPRO can measure sample quantities down to mg's thank to its patented (US8132476) Microdoser attachment.

EXPERIMENT

Two types of samples were investigated with the Microdoser : Firstly some Pd nanoparticles (fig. 1), which is a classic hydride example and then an activated carbon sample (fig. 2), which is a classic example of high surface area adsorbent. Both PCT isotherms were obtained close to room temperature.

RESULTS AND CONCLUSION

The results demonstrate that reliable PCT measurements can be obtained with small sample sizes. Therefore comparison with bulk samples can be easily made. The GASPRO can measure PCT isotherms of very small sample sizes. It demonstrates that the Sievert's technique is ideally suited to compete with gravimetric methods for small quantification of ad/absorbed gas.

Measurements provided courteous of Y.W.Lee, and Prof. B. Clemens Stanford University

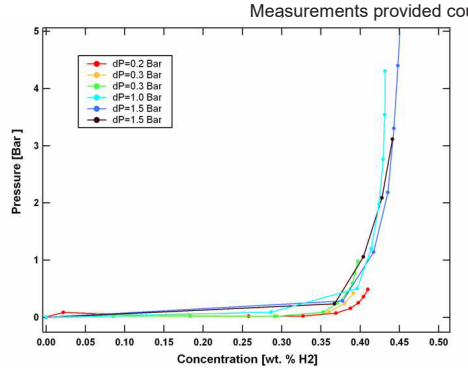

Fig 1: Measured PCT isotherm with Pd nanoparticles grown by LVCC (laser vaporization controlled condensation) from Virginia Commonwealth University
Sample mass 20 mg
T=RT

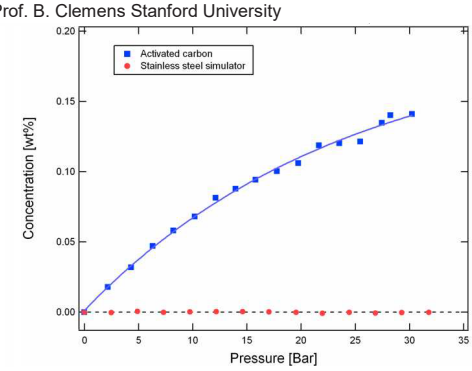

Fig 2: Measured PCT isotherm with Activated Carbon Sample mass 39 mg
T=22.5 °C

INSTRUMENT

GASPRO

-260°C to 500°C

VARIETY OF MODES OF OPERATION
ability to combine PCT, kinetics and cycle life modes to 200bar to determine the quantity and rate of sample gas interaction and its aging characteristics all in one instrument and operation

PRECISION MEASUREMENT OF SMALL SAMPLES
using the patented microdoser option to inject small doses of gas on the sample

HIGH ACCURACY VERSION
to reduce cumulative error across multiple measurements points

EXTERNAL CALORIMETER COUPLING CAPABILITY
to increase your research options