

CHARACTERISATION OF THE HYDROGEN SORPTION PROPERTIES OF METAL HYDRIDES

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Determination of the hydrogen sorption properties of metal hydrides is required for fundamental studies and to assess their use in a range of applications. The most common techniques used for this purpose are the manometric (or volumetric) and gravimetric techniques. Due to its ease of implementation, the manometric technique, commonly known as Sieverts' method, is the most popular.

In both cases, the principles behind the measurements are straightforward. Manometric measurement involves the use of molar balance expressions to determine the amount of hydrogen absorbed by a sample contained in a system of fixed, known volume; while gravimetric measurements typically use a microbalance to determine the amount of hydrogen absorbed by accurately measuring the weight change of a sample under different H₂ pressures. Practically, however, each technique can be subject to significant error if measurements are not performed with care. This susceptibility to error was demonstrated by the results of an interlaboratory study, published by Moretto et al [1] in 2013.

In this presentation, we look at these techniques in more detail, and consider their advantages and disadvantages. We will also discuss some of the pitfalls that can be encountered in the measurement of hydrogen absorption and desorption, in the context of work on error sources in the field [2-5], and discuss future research needs.

References

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