

差压法测定 NEG 吸氢性能*

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摘 要:通过对定压法进行改进提出了差压法,用于测试非蒸散型吸气剂(NEG)的吸氢性能。该方法在进气室和吸气室之间安装固定流导元件,利用调节微调阀提供可控的进气流量,通过测量吸气室、进气室和参考室的压力计算 NEG 的吸气性能参数。利用两种 NEG 比较了差压法和改进的定压法所测吸气性能。结果表明:差压法测得的吸气容量比改进的定压法测得的吸气容量低 $0.07268 \text{ Pa} \cdot \text{L}$;腔室壁面吸附能力使改进定压法的试验结果高于理论结果,而差压法的试验结果不受影响;对改进的定压法进行优化后,其计算结果与差压法的接近。差压法可以获得更准确、更有效的吸气剂性能参数,在差压法中,参考部分和试验部分同时进行测试,可缩短测试时间,减少控制进气带来的误差。

关 键 词:差压法;吸氢性能;非蒸散型吸气剂(NEG);改进的定压法

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Measurement of Hydrogen Absorption Performance of NEG by Differential Pressure Methods

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Abstract: By improving the constant pressure method, the differential pressure method was proposed to test the hydrogen absorption performance of non-evaporable getter (NEG). A constant conductance element is installed between the gas room and the induction chamber to provide controllable inlet flow with micrometering valve. The sorption performance parameters of NEG can be calculated by measuring the pressure of induction chamber, gas room and reference chamber. The sorption performance of two NEG absorbers measured by the improved constant pressure method and differential pressure method were compared during sorption test. The results show that the sorption capacity measured by differential pressure method is $0.07268 \text{ Pa} \cdot \text{L}$ lower than that measured by improved constant pressure method. The suction of clean chamber wall leads to higher test results of the improved constant pressure method than the actual result, while the test results of the differential pressure method are not affected, and the results of the modified improved constant pressure method are close to those of the differential pressure method. The differential pressure method can obtain more accurate and effective performance parameters of getters. In the differential pressure method, the reference part and the experimental part are tested at the same time, which can shorten the test time and reduce the error caused by inlet controlling.

Key words: differential pressure method; hydrogen absorption performance; non-evaporable getter (NEG); improved constant pressure method

非蒸散型吸气剂(NEG)可用于吸收密闭空间内的残余气体并长期维持真空环境^[1-2]。获得准确的吸气性能是 NEG 研究和应用的前提。NEG 吸气性能基本的测试方法有定容法和定压法^[3-5]。定容法可以粗略地计算吸气容量,或得

到 NEG 的吸附等温线^[6-7]。Petkov 等^[8]用定容法测试了使用 ZLA 吸气剂后真空室内压力的变化,评价了 NEG 的吸气能力,估计了 ZLA 吸气剂在 25°C 下吸气压力随吸气能力的变化。张瑞年等^[9]在定容法的基础上增加了冷阱,冷阱可将吸氢过程中

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