

Testing, Reactivating, and Cleaning Palladium Catalysts. MIKE E. COX. *From Anaerobe Systems, San Jose, California*

Alumina pellets coated with palladium are used to help maintain an oxygen-free environment in anaerobic chambers and anaerobic jars. The palladium catalyzes the reaction of hydrogen with oxygen to produce water.

Moisture absorption by the alumina and the presence of certain metabolic end products can inactivate the catalyst. Hydrogen sulfide commonly produced by bacteria growing in an anaerobic chamber or anaerobic jar can "poison" the catalyst and render the catalyst useless. It was previously thought that "poisoning" of the palladium catalyst by hydrogen sulfide was irreversible [1].

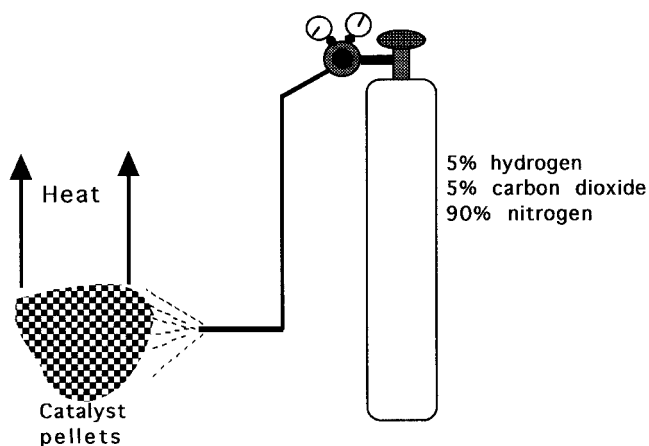


Figure 1. Procedure for testing the palladium catalyst. The procedure is as follows: 1. Cool the catalyst to room temperature. 2. Flow the anaerobic gas mixture over the catalyst in room air. 3. If the catalyst produces heat, then it is active. 4. If the catalyst remains at room temperature, then it is "poisoned" and should be cleaned.

The palladium catalyst is routinely activated by heating it at 160°C for 2 hours. The catalyst can be tested for activity by flowing the anaerobic gas mixture containing 5% hydrogen, 5% carbon dioxide, and 90% nitrogen over the catalyst in room air. If the catalyst produces heat, it is active (figure 1). If the catalyst does not produce heat, it should be cleaned. The catalyst is cleaned by heating it to 200°C and then by flowing the anaerobic gas mixture over the hot catalyst in room air (figure 2).

The procedures presented in this report provide methods to test the reactivity of palladium catalysts and to clean the catalyst when it becomes "poisoned."

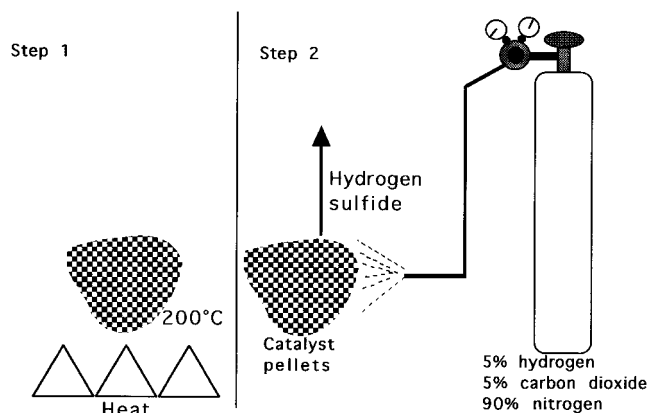


Figure 2. Procedure for cleaning the palladium catalyst. The procedure is as follows: 1. Heat the catalyst to 200°C. 2. Flow the anaerobic gas mixture over the catalyst in room air while the catalyst is hot. 3. When the catalyst stops liberating the hydrogen sulfide odor, it is clean.

Reference

1. Levett PN. *Anaerobic microbiology: a practical approach*. New York: Oxford University Press, 1991:4.

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