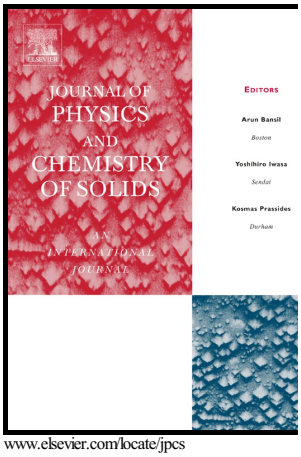


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PII: S0022-3697(15)30009-3
DOI: http://dx.doi.org/10.1016/j.jpcs.2015.07.003
Reference: PCS7581

To appear in: *Journal of Physical and Chemistry of Solids*

Received date: 23 February 2015
Revised date: 2 July 2015
Accepted date: 6 July 2015

Cite this article as: M. Díaz and A.C. González, Effect of bias voltage and electrodes size on the Pd conductance histograms, *Journal of Physical and Chemistry of Solids,* http://dx.doi.org/10.1016/j.jpcs.2015.07.003

# Effect of bias voltage and electrodes size on the Pd conductance histograms

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Abstract

Conductance histograms of palladium nanocontacts in ultra high vacuum (UHV) were experimentally studied at room temperature using scanning tunneling microscope (STM). Our results show that the resolution of the pure Pd peaks, at 1.8 and around $3G_0$, in the histograms, depends on the bias voltage and the electrodes size. The size of the electrodes should be as small as possible to achieve the higher extraction of hydrogen from them and therefore preventing the diffusion of H from the bulk to the nanocontacts during the conductance measurements, particularly at low bias voltage. This could explain why peaks have not been observed previously in the Pd histograms, using STM techniques in UHV.

Keywords: A. Nanostructures; A. Metals; C. Scanning tunneling microscopy (STM); D. Electrical conductivity



## 1. Introduction

Fabrication and characterization of metal nanocontacts have attracted attention due to their potential applications in electronic devices. In particular, palladium nanocontacts are interesting due to this metal having the property of absorbing high concentrations of hydrogen at room temperature. A large variety of experiments have been performed using scanning tunneling microscopes (STM) [1-3], mechanically controllable break

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