Contribution ID: **203** Type: **Poster**

Measuring the Change of Gas Flow Conductance Due to Altered Surface Conditions of a Tube

Tuesday 19 June 2018 18:00 (20 minutes)

Gas flow conductance of a tube can be measured with the pressure decay method. Here, a vacuum chamber of volume V is pumped through the tube, which allows for conductance C to be determined from the slope of the logarithm of the pressure decay curve $C = V \times \mathrm{d}(\ln(p))/\mathrm{d}t$, if upstream pressure p is measured with sufficient precision. In our case, estimated uncertainty of the measured conductance is 0.3%, and reproducibility is below 0.2%. Conductance was measured for an electropolished stainless steel tube with inner diameter 7.76 mm and length 776 mm, using various pure gases. Conductance was then measured after several surface treatment steps, including heating with exposure to either O2 and H2, and vacuum baking the tube surface. The tube was then etched in *aqua regia* in order to produce macroscopic roughness of the inner surface, and the previous process was repeated. For He gas the maximum difference of tube conductance of different treatments was as high as 19 %.
The observed difference in values of conductance in molecular regime was attributed to changes of effective tangential momentum accommodation coefficient. Results were compared with published research on tangential momentum accommodation coefficient of spinning rotor vacuum gauge.

Author: VERBOVSEK, Tim (Institute of Metals and Technology, IMT)

Co-authors: SETINA, Janez (IMT); SETINA BATIC, Barbara (IMT)

Presenter: VERBOVSEK, Tim (Institute of Metals and Technology, IMT)

Session Classification: Poster Session Tuesday

Track Classification: Vacuum Science & Technology