

Abstract Submitted  
for the GEC08 Meeting of  
The American Physical Society

**Electron attachment to SF<sub>6</sub> at high temperatures**<sup>1</sup> T.M. MILLER, J.F. FRIEDMAN, A.A. VIGGIANO, Air Force Research Laboratory, J. TROE, Universität Göttingen — We have recently reported flowing-afterglow Langmuir-probe experiments on electron attachment to SF<sub>6</sub>, thermal electron detachment from SF<sub>6</sub><sup>-</sup>, and the pressure dependence of the processes involved, in the temperature range 300-670 K, including theoretical analysis of the possible outcomes of the electron-SF<sub>6</sub> interaction, with modeling of the data. One significant result of that work was the finding that the electron affinity of SF<sub>6</sub> is  $1.20 \pm 0.05$  eV.<sup>2</sup> We have now extended the temperature range up to 1300 K. The electron attachment rate constant at 700 K is  $1.7 \times 10^{-7}$  cm<sup>3</sup> s<sup>-1</sup> (yielding SF<sub>5</sub><sup>-</sup> and SF<sub>6</sub><sup>-</sup> product), and the thermal detachment rate constant for SF<sub>6</sub><sup>-</sup> is 580 s<sup>-1</sup>. F<sup>-</sup> becomes a major ion product at 1000 K and above. We suspect that in this temperature range the SF<sub>6</sub> molecules are decomposing, because the SF<sub>5</sub><sup>-</sup> ion product disappears above 1100 K, and only the F<sup>-</sup> ion product remains. Further work must be carried out to determine the origin of the F<sup>-</sup>, whether from decomposition or a surface-ionization effect.

<sup>1</sup>Supported by AFOSR.

<sup>2</sup>A. A. Viggiano et al., J. Chem. Phys. 127, 244303, (2007).

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Date submitted: 16 Jun 2008

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