**Experimental Setup**

1. **Tube-APCI source** including a commercially available APCI needle device generally also used in LFS (current control by Equipe-Control-Software, 1 - 4 µA) - Coupling to modular tube segments (mirrors the AP transfer-region of the LFS); simple variation of length and material (tube segments are insulated) - Total ion current: Measured with a directly coupled gauging mesh (insulation to the tube segments possible) - Controlled gas inlet

**Materials**

- Tube Configurations
- Length: Borsilicate glass 33.2 mm (short tube) - Teflon® 73.24 mm (medium tube) - PVC 126.1 mm (long tube) - Alodined aluminum - Borsilicate glass surrounded by Electrode array - Potential gradient along the glass tube, see right hand side

**Results**

<table>
<thead>
<tr>
<th>Length</th>
<th>Signal Intensity</th>
<th>Electrode Potential (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.2 mm</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
</tr>
<tr>
<td>73.24 mm</td>
<td>1.00E-07</td>
<td>3.00E-08</td>
</tr>
<tr>
<td>126.1 mm</td>
<td>2.00E-08</td>
<td>4.00E-08</td>
</tr>
</tbody>
</table>

- **Results**
  - Influence of the Tube Material on the Mass Spectrum:
    - Measurements with setup 1 including PVC (a) and glass (b) for the transfer region
      - Similar signal intensity for all materials (except anodized aluminum)
      - Large differences in the response times required to reach the final intensity

- **Results**
  - Comparison of the response time of the tube materials
    - A correlation of the response time and the wall material
    - Porous materials show a faster response time than solid materials

**Methods**

- **Experimental Setup**
  - Equipment: KENETHFAY 6593D FID/FLAMEPHOTOGRAPHIC SENSING SYSTEM MS: Bruker eqxipo3000 quadrupole ion trap Source: Custom built tubular APCI including a commercially available APCI needle device
  - Gauge: Nitrogen (5.0), Helium (4.0), and Argon (1.0)

**Data**

- Tube Length Variation (setup 1, (a))
  - All materials except anodized aluminum show similar final signal intensity up to 9 µA using the short tube
    - Similar signal intensities for all materials (except anodized aluminum)
  - Large differences in the response times required to reach the final intensity

- **Mass Spectrometric Measurements**
  - Influence of the Tube Material on the Mass Spectrum:
    - Measurement of reactant ions in different tube lengths
      - The signal intensity for all tube lengths is dominated by gas flows
        - Gas Flow Variation (setup 1, (c))
          - Tube Length Variation (setup 1, (a))
            - All materials show low response variation of the Rf-Flow
          - At non-flow conditions no significant change in final intensity
          - Signal is almost independent of the Rf Flow
          - Space charge driven transfer

**Future investigations are required for a better understanding of the impact of such boundary layers on the transfer efficiency for reactant ions in LFS sources**