IR spectroscopy with pyrolytic carbon string resonator as a tool for particle detection

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**INTRODUCTION**

**MEMS String Resonator**

Pyrolytic Carbon

- Isotropic properties
- Conductive material
- Controlable properties

Pyrolytic Carbon String Resonator

Infrared Spectroscopy

**RESULTS AND DISCUSSION**

**SEM image of pyrolytic carbon string**

- Length 500µm
- Thickness 700nm

**Resonance Frequency**

![Graph showing resonance frequency vs. inverse length](image)

- $\sigma = 723,2 \text{ MPa}$
- String Width 15µm

**Quality Factor**

![Graph showing quality factor vs. string width](image)

**IR Absorption**

- An absorption peak at 1760cm\(^{-1}\)

**Allan Deviation**

- Minimum AD of 10ppm at 10 seconds

**CONCLUSION**

We demonstrate the fabrication of the pyrolytic carbon string resonators with optimized process. The carbon string resonators are then characterized by interferometry to obtain the resonance frequency and $Q$ factor. A resonant photothermal IR absorption measurement shows the absorption spectrum of the materials. The results show the potential of the pyrolytic carbon string resonators as a tool for particle detection.