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

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Pyrolytic Carbon

MEMS String Resonator

Pyrolytic Carbon

- Isotropic properties
- Conductive material
- Controlable properties

Pyrolytic Carbon String Resonator

Infrared Spectroscopy

INTRODUCTION

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RESULTS AND DISCUSSION

SEM image of pyrolytic carbon string

Length 500µm
Thickness 700nm

Resonance Frequency

\[ f = \frac{c}{2l} \]

Quality Factor

\[ Q = \frac{f}{Q} \]

IR Absorption

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

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.