Design and Simulation of Quadrupole Mass Filter for the Detection of Carcinogenic Substance Formaldehyde

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Abstract

Mass Spectrometry is a well-established gold technology, known for its high precision and accuracy in the field of material analysis. Applications of mass spectrometry particularly in biomedical area are limited by the cost and large size of equipment. The limitations are addressed by miniaturizing of mass spectrometer complements through MEMS technology. Quadrupole Mass Filter used in Quadrupole Mass Spectroscopy has been designed using COMSOL Multiphysics. The length of the quadrupole rod is 70mm having resolution of 41 at 2MHz. The design operates on apex of 1st stability region at U/V=0.1406. Filter is designed for the detection of Formaldehyde having mass 30amu which is commonly used in preservation of fish to keep their freshness and other household products. According to IRAC (2004) formaldehyde is considered as carcinogenic substance.