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## DESIGN AND SIMULATION OF MULTICHANNEL QCM DEVICES

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**Abstract** QCM (Quartz Crystal Microbalance) is a widely used biosensor in multiple industries and fields including medical, food safety and environmental health. However, its advances are predominantly focused on utilizing single channel on a QCM substrate. This limits the active area on QCM limited to the single channel and wastes the potential of the surface area of the substrate. The data received from a single channel QCM also lacks certainty where there is no other sensor that can verify or do cross-checking on its data real-time. The existing quartz thickness of 168  $\mu\text{m}$  does produce a high resonance frequency, however the QCM device is prone to break because of its extremely thin substrate, making it hard to handle. The aim of this study is to investigate, design and simulate the most significant parameters that contribute to the performance of multichannel QCM devices. The study examines the suitable quartz thickness and electrode sensor radius for single channel QCM, then proceeds to vary the  $r_2/c$  distance for

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