SENSITIVITY ENHANCEMENT FOR SLOTTED QUARTZ TUBE FLAME ATOMIC ABSORPTION SPECTROMETRY USING AN AIR SCREEN

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It is well known that a Slotted Quartz Tube (SQT) provides a sensitivity enhancement of 2-5 times in Flame AtomicAbsorption Spectrometry (FAAS) depending on the element \cite{1}. An Air Screened Slotted Quartz Tube (AS-SQT) was designed for further increase the residence time of analyte atoms in the light path (Figure). For this purpose, two slotted air chambers were fixed on the left and right sides of a burner head and the air was supplied into the slotted chambers perpendicular to the light path to produce two thin layers of air screen. It was observed that these air screens can move up the flame tails in two sides of SQT. For Manganese, the signal increases 2-fold with respect to SQT alone; while for Zinc the effect was negligible but signals were more reproducible. The limits of quantitation were found to be 20 ng mL\textsuperscript{-1} for Zn and 70 ng mL\textsuperscript{-1} for Mn and the limits of detection (3S) were found to be 4.7 ng mL\textsuperscript{-1} for Zn and 11.7 ng mL\textsuperscript{-1} for Mn. Enhancement factor for Zinc using only SQT was 5-fold with respect to FAAS alone.

\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure1.png}
\caption{An Air Screened Slotted Quartz Tube (AS-SQT)}
\end{figure}

References