

A METHOD OF DETECTION OF LOW CONCENTRATION OF ANALYTES BY SUPERHYDROPHOBIC PRE-CONCENTRATION PAPER SPRAY IONIZATION MASS SPECTROMETRY (SHPPSI MS)

IITM Technology Available for Licensing

Problem Statement

- The problem statement discussed in the present subject matter is *how to achieve spontaneously on a superhydrophobic (SHP) paper*.
- Hence, Present invention provides the solution in efficient manner.

Technology Category/ Market

Technology: Detection of low concentration of analytes by superhydrophobic pre-concentration paper spray ionization mass spectrometry (SHPPSI MS)

Industry & Application: Food Industry, Milk Industry & etc.;

Technology

- Present patent describes a method namely **SHPPSI MS** which combines **pre-concentration and ionization** on the substrate, useful in many **analytical situations**. (Refer Fig. 1)
- The claimed subject matter relates to a **simultaneous pre-concentration cum ionization method** for the analysis of analytes in solutions combined **on a paper**, wherein the **pre-concentration** is achieved by **having a hydrophobic coating** on the paper and with a **point defect** made at the **tip of the paper**.
- Applicable for the **detection of analyte at extremely low levels down to picomolar and lower in complex mixtures**.

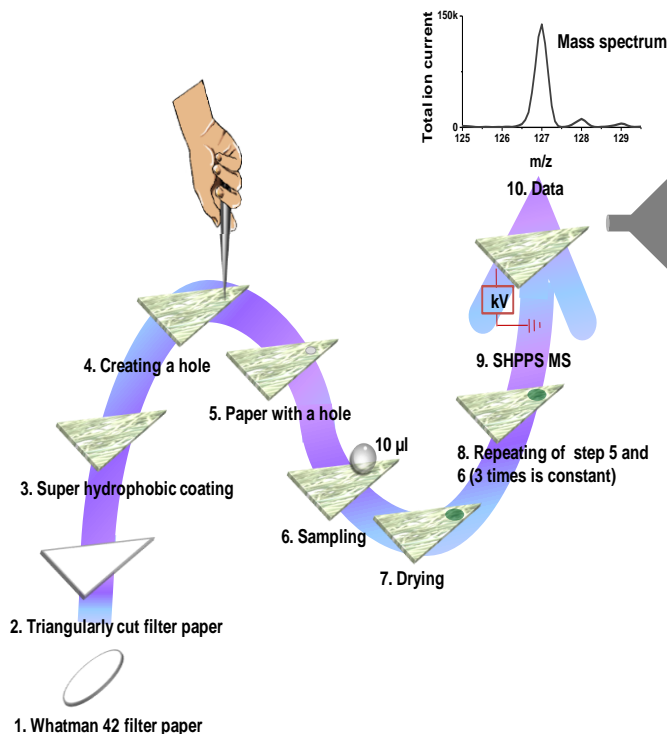


FIG. 1 illustrates Schematic representation of the consecutive steps involved in the experimental set-up for SHPPSI MS. SHP coating can be made by any of the methods commonly used for making such surfaces.

Intellectual Property

IITM IDF Ref. 1640; Patent No. 504588

TRL (Technology Readiness Level)

TRL-4, Technology validated in Laboratory

Research Lab

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Images

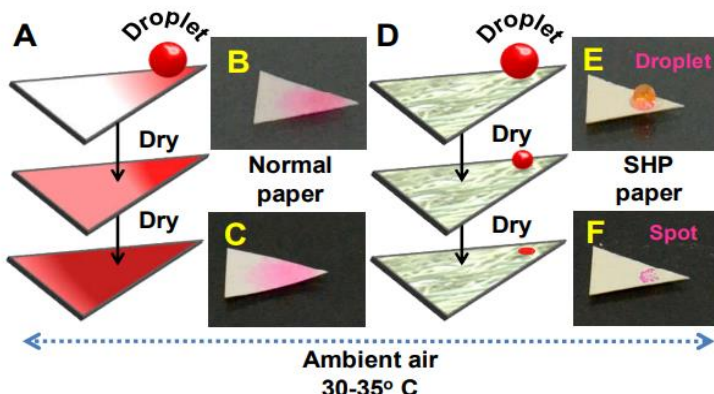


Fig.2 shows Liquid droplet behavior on A) **Whatman** 42 filter paper D) Superhydrophobic paper. B), C) and E), F) are optical images of the wet and dry paper samples.

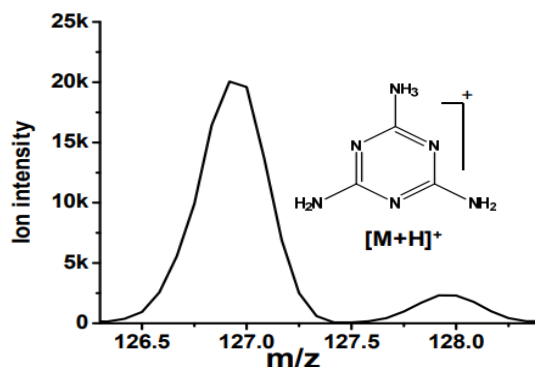
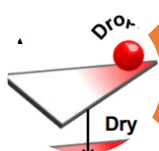


Fig.3 depicts Mass spectrum of melamine found in laboratory-made artificially adulterated milk. Melamine concentration in the milk was 5nM or **5X10⁻⁹ M**

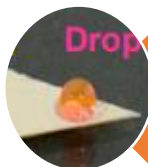
Key Features / Value Proposition



Facilitates a new ambient ionization method called superhydrophobic pre-concentration paper spray ionization mass spectrometry (SHPPSI MS) where a pre-concentration technique is coupled with paper spray mass spectrometry.



More specifically, provides superhydrophobic coating on a paper spray source with localized sample deposition, pre-concentration, and elution combined with mass spectrometry.



The pre-concentration is achieved by surfaces with water contact angle $\geq 90^\circ$ and hexane contact angle $\geq 90^\circ$



The ions are detected by mass spectrometer, Faraday cups and ion mobility spectrometers

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