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nmRC CASE STUDY

TEXTILE CONTAMINATION

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Textile Contamination

Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS) Case Study

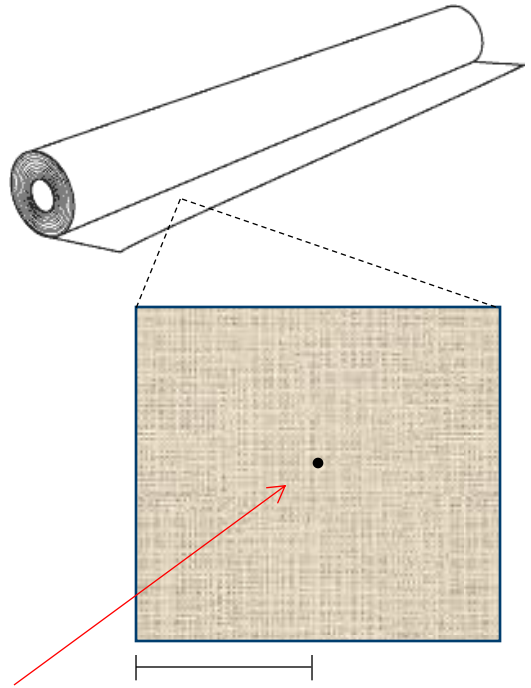
TEXTILE CONTAMINATION

Guilford Europe Ltd

Guilford performance textiles

Contamination Problem:

- Unknown contaminant material appearing irregularly on bulk textile produce
- Tens of thousands of £'s of waste material annually



Contaminant Spotting

TIME-OF-FLIGHT SECONDARY ION MASS SPECTROMETRY (ToF-SIMS)

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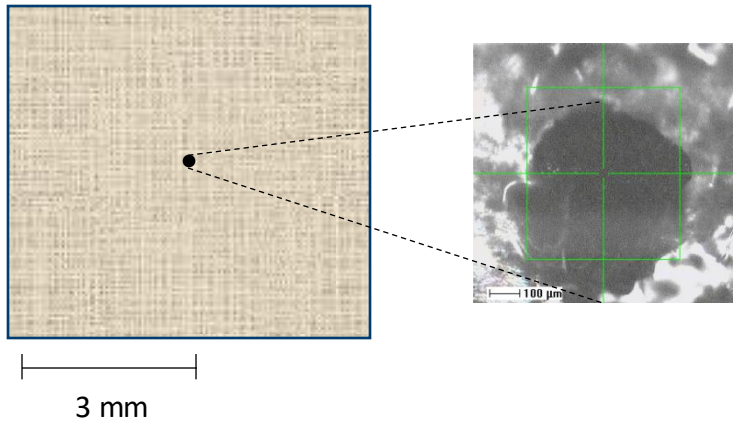
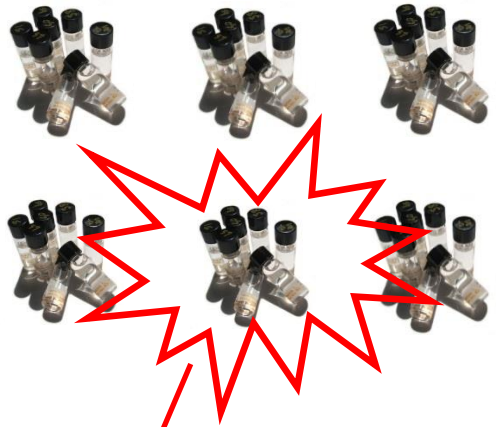
Guilford performance textiles

- ToF-SIMS allows for spatially resolved highly mass sensitive (ppm) chemical analysis

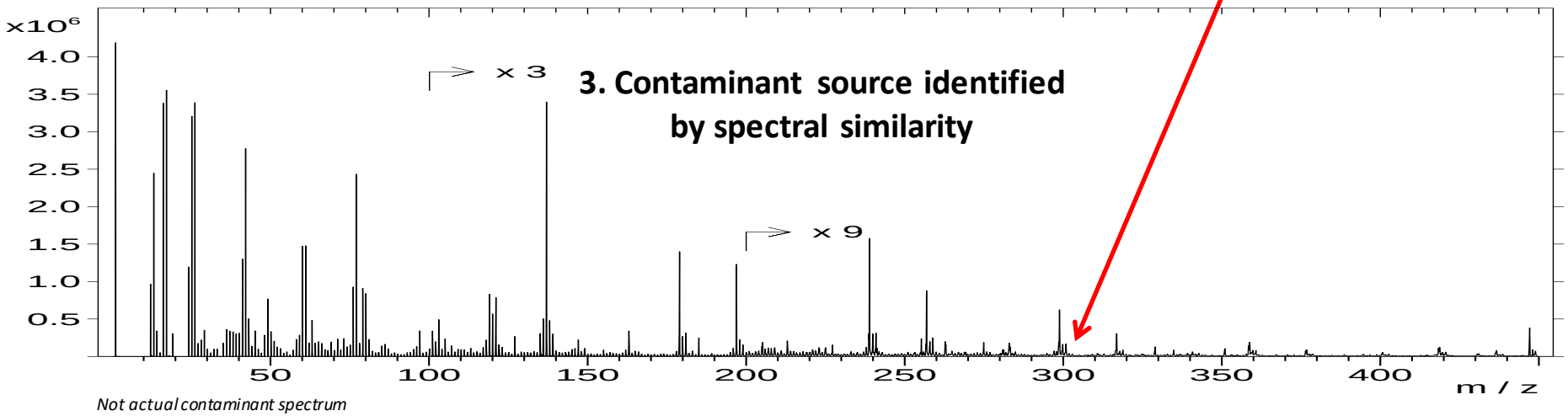


1. Contaminant extracted and analysed by ToF-SIMS

Spectrum Compared Against



2. 48+ raw materials analysed



3. Contaminant source identified by spectral similarity

Not actual contaminant spectrum

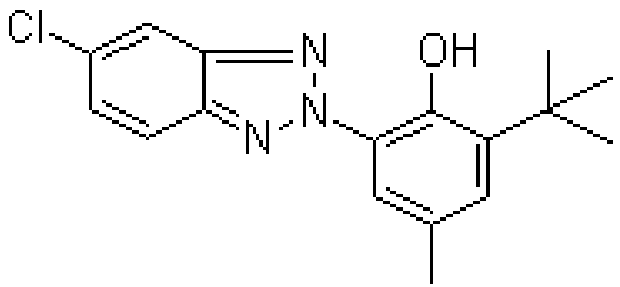
SPECTRAL ANALYSIS

Guilford performance textiles

Results:

- Chemical similarities found in several materials (Cl^- and CN^- & CNO^-)

- Clusters of peaks identified around 315 m/z matching one raw material:



Bumetrizole

- A specific dying agent that was not being fully washed out after the dying process.

SUMMARY

Guilford performance textiles

Further Results:

- Identification of bearings grease stains on textiles following bearing failure.
- Identification of raw materials from database contributing to other subtle contaminations.

- ToF-SIMS offers highly surface sensitive (1-2nm), spatially resolved, femtomolar mass sensitive (ppm) chemical analysis.
- ToF-SIMS was used to identify an unknown textile contaminant responsible for thousands of pounds of waste material.
- Spectra from contaminated sample were assessed against those from a raw material database.
- A source material responsible was identified and a process problem subsequently negated.

REFERENCES / ACKNOWLEDGEMENTS

The Time-of-Flight Secondary Ion Mass Spectrometry analysis documented here was performed in the Advanced Materials and Healthcare Technologies research division of the School of Pharmacy at the University of Nottingham.

AMHT
Advanced Materials & Healthcare Technologies

ADDITIONAL INFORMATION

- We hope the information provided in this case study is of interest.
- If you wish to get in touch with us to discuss any of the information provided, raise a query/concern or provide feedback then please use any of the methods listed below:

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