

Detection and quantification of Carbonaceous Particles in Ambient Air

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OUTLINE

- INTRODUCTION
- EXPERIMENTAL
- MEASUREMENTS & EVALUATION
- SOOT RAMAN SPECTRA
- SUMMARY & OUTLOOK

DETECTION OF SOOT IN AMBIENT AIR

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INTRODUCTION

- THERMAL ANALYSIS
- EXTINCTION
- FILTER TRANSMISSION OR REFLECTION
- LASER INDUCED INCANDESCENCE
- PHOTOACOUSTIC SOOT SENSOR
- **RAMAN SOOT SPECTROSCOPY**

PROPERTIES OF Raman SCATTERING

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OUTLINE

INELASTIC SCATTERING PROCESS

INTERACTION OF LIGHT AND VIBRATIONAL ROTATIONAL MODES

**SHAPE AND RELATIVE SPECTRAL POSITION OF RAMAN BANDS
DEPEND ON CHEMICAL COMPONENT**

**ABSOLUTE SPECTRAL POSITION OF RAMAN BANDS DEPENDS
ON EXCITATION WAVELENGTH**

AMPLITUDE DEPENDS ON NUMBER OF MOLECULES

RAMAN SCATTERING CROSS SECTION IS WEAK

**DETECTION AND QUANTIFICATION
OF CARBONACEOUS PARTICLES
IN AMBIENT AIR**

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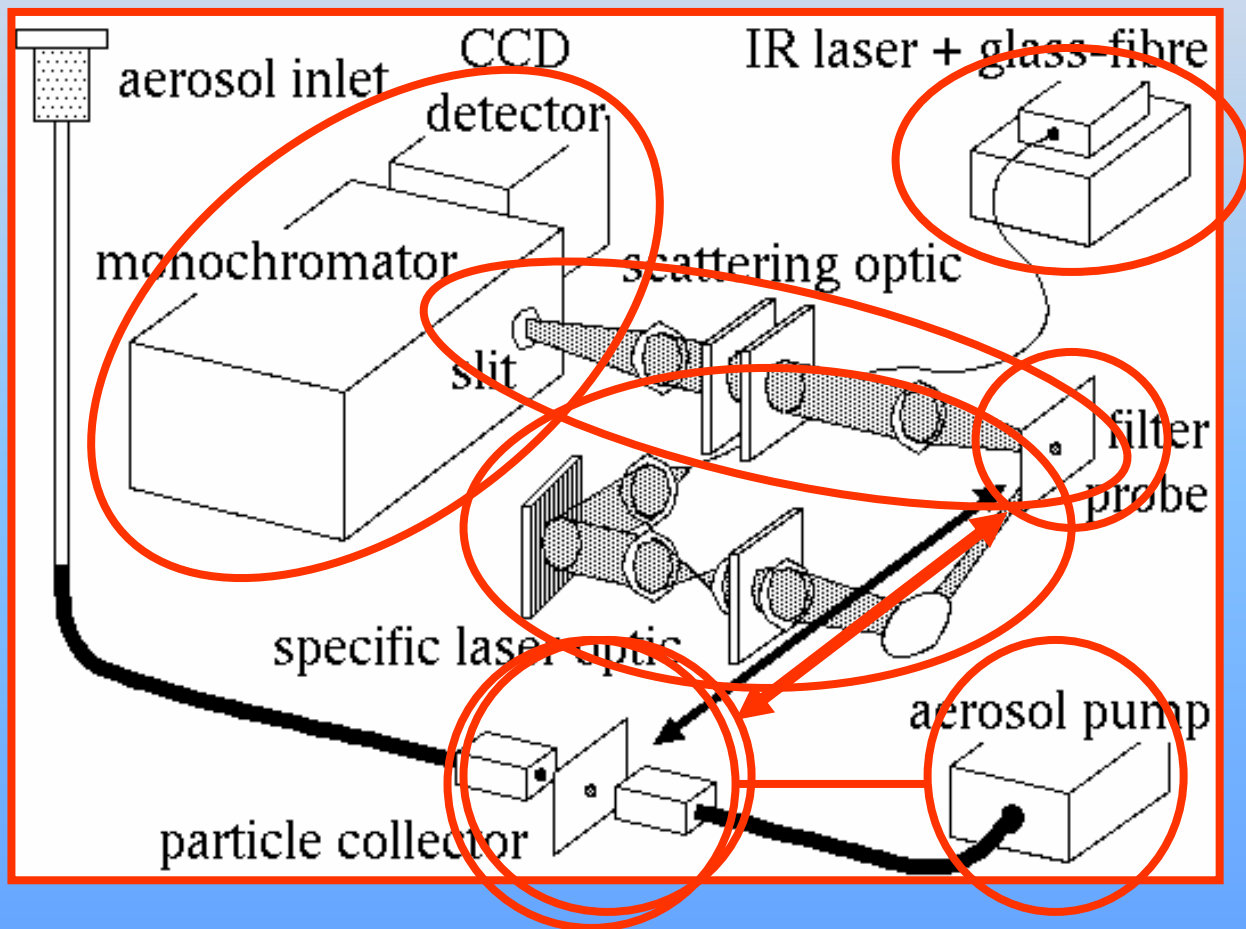
EXPERIMENTAL

EXPERIMENTAL

EXPERIMENTAL SET-UP

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EXPERIMENTAL



EXPERIMENTAL SET-UP

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EXPERIMENTAL SET-UP

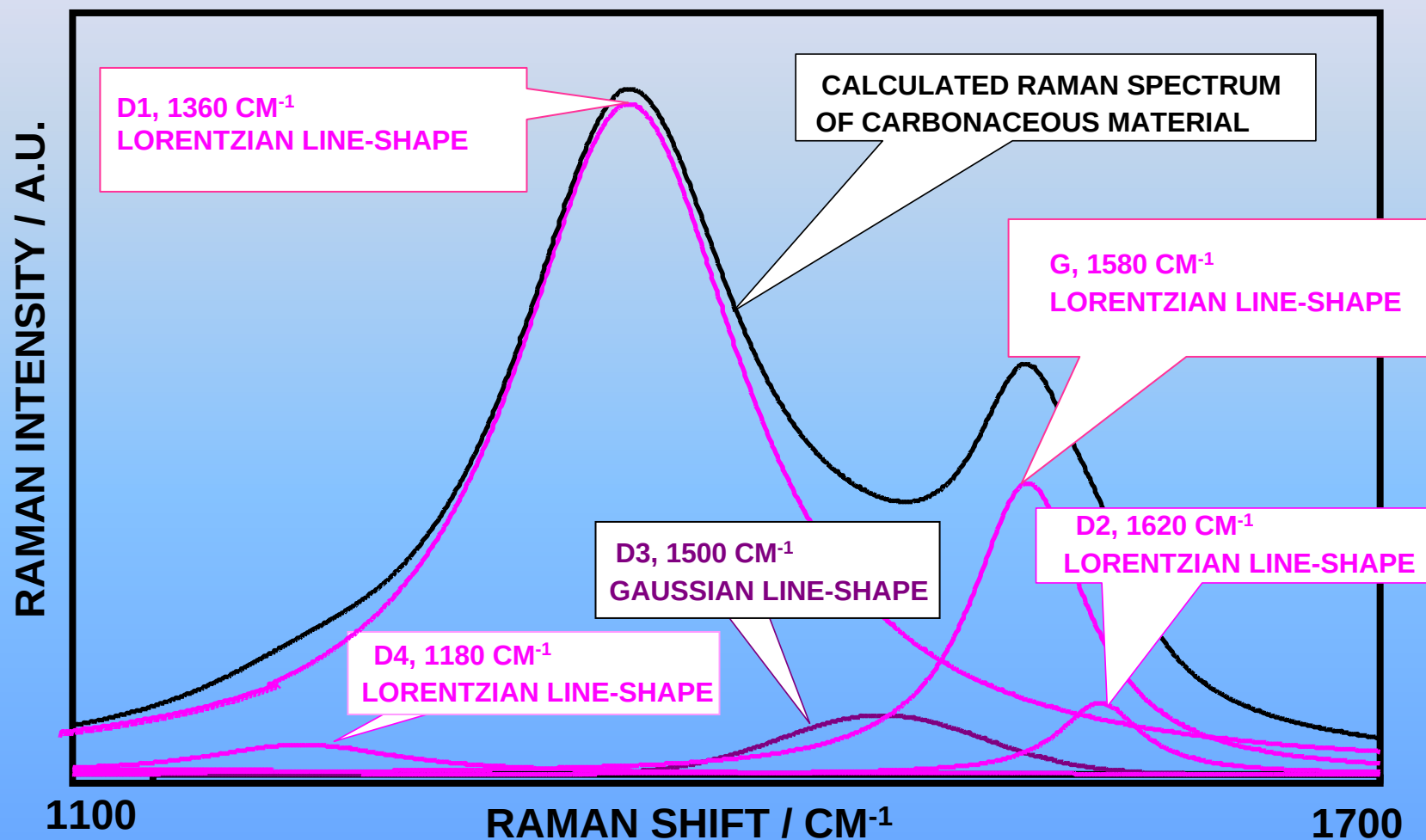


SAMPLING & EVALUATION

COMPONENTS OF SOOT RAMAN BAND

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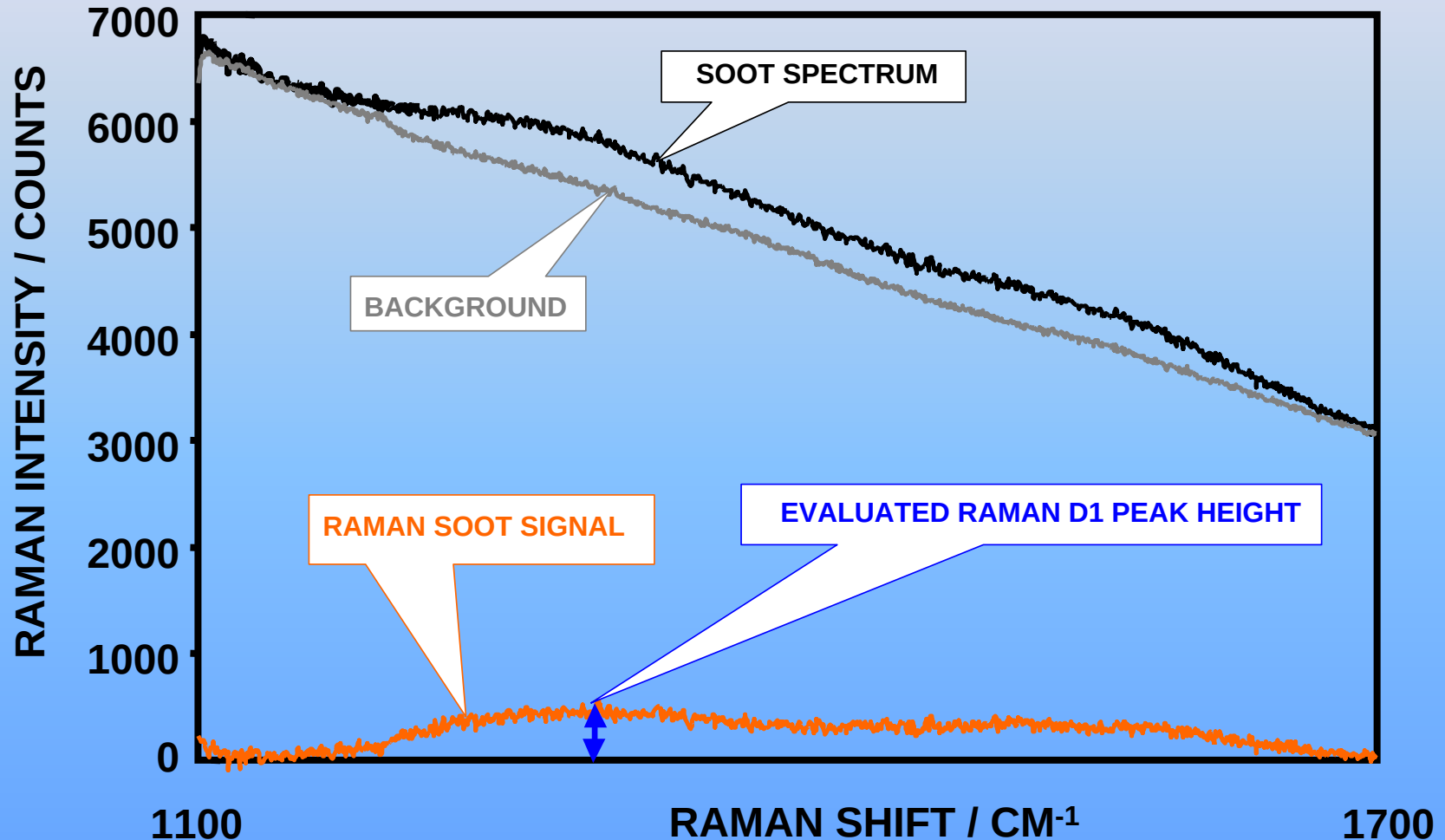
EVALUATION



RAMAN SPECTRUM SOOT ON FILTER

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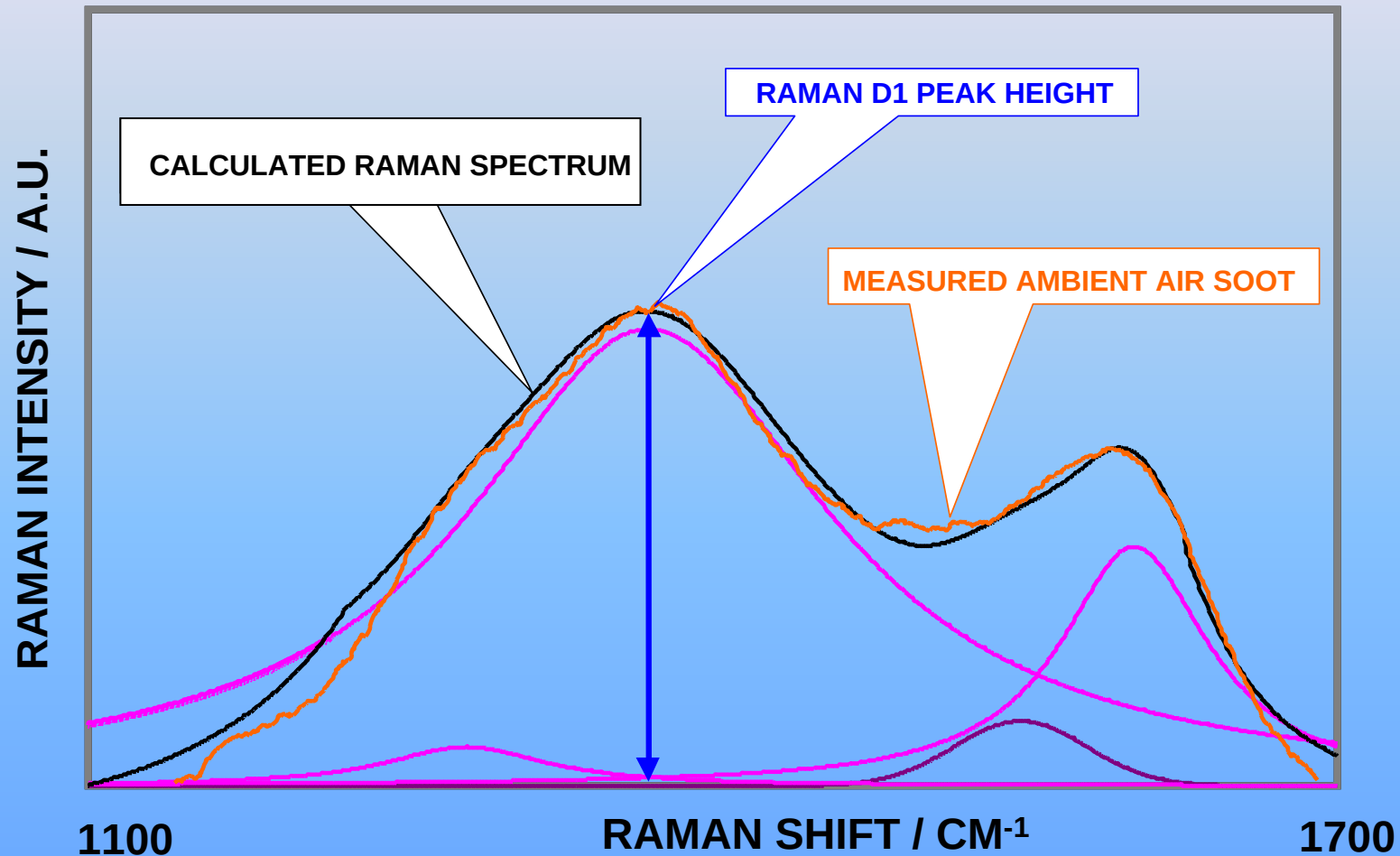
EVALUATION



RAMAN SPECTRUM SOOT ON FILTER

RUHR-UNIVERSITÄT BOCHUM

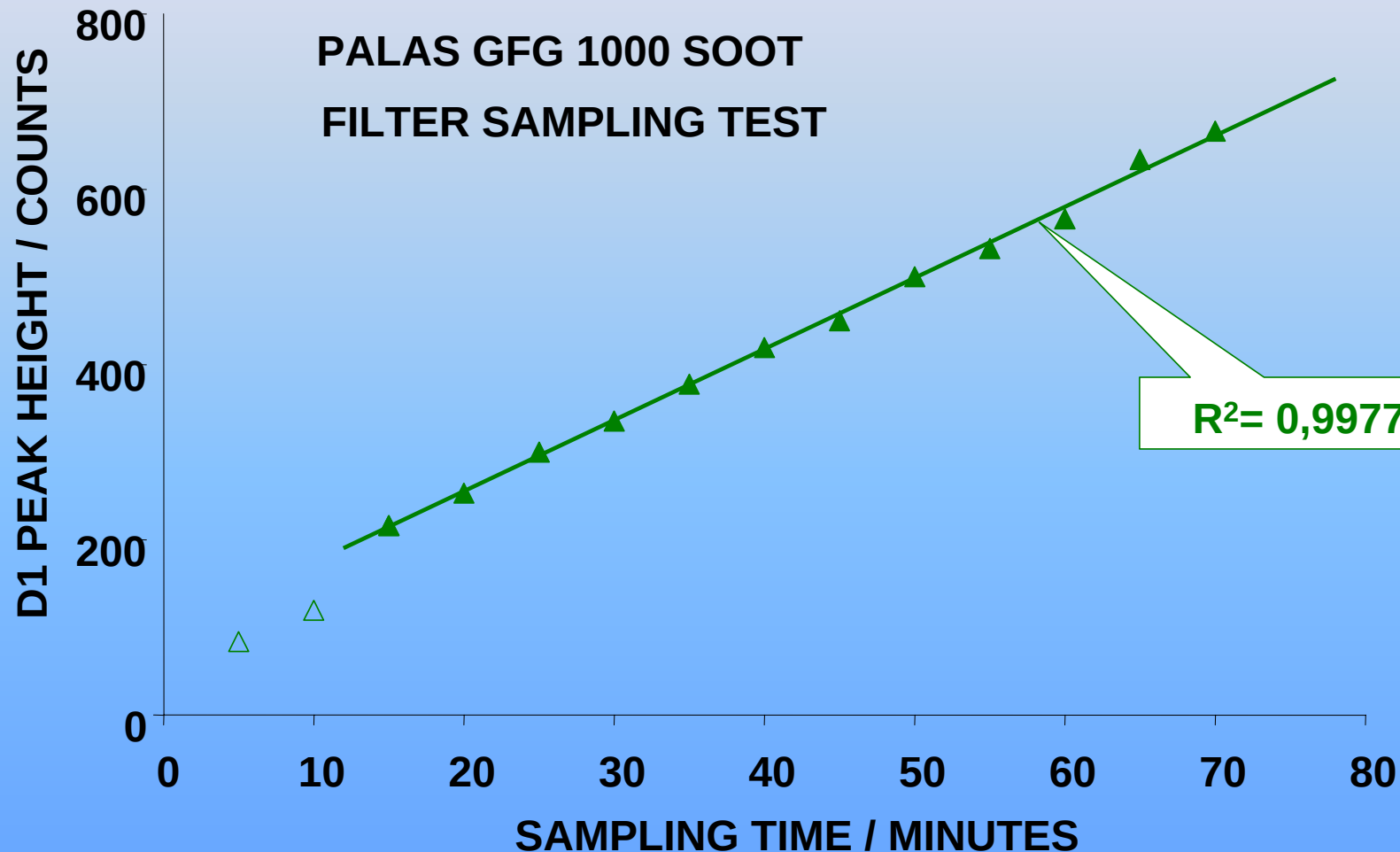
EVALUATION



RAMAN INTENSITY VERUS SAMPLING TIME

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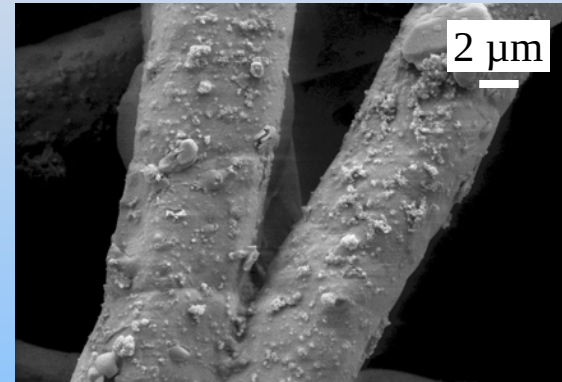
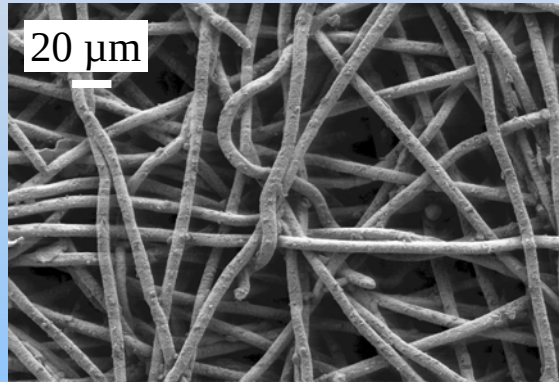
EVALUATION



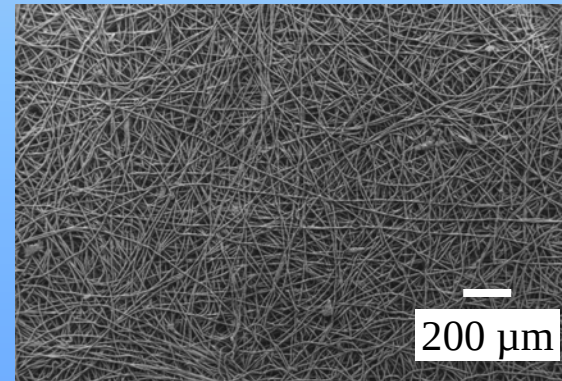
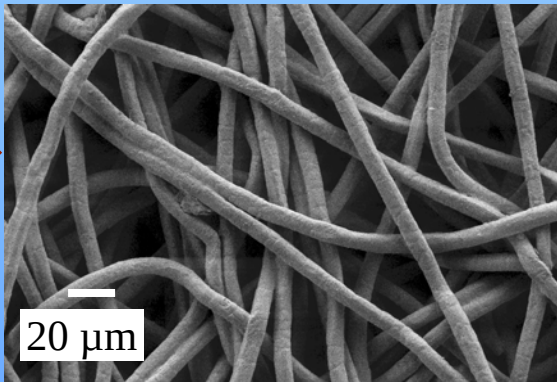
REM PICTUREs OF FILTER SURFACE

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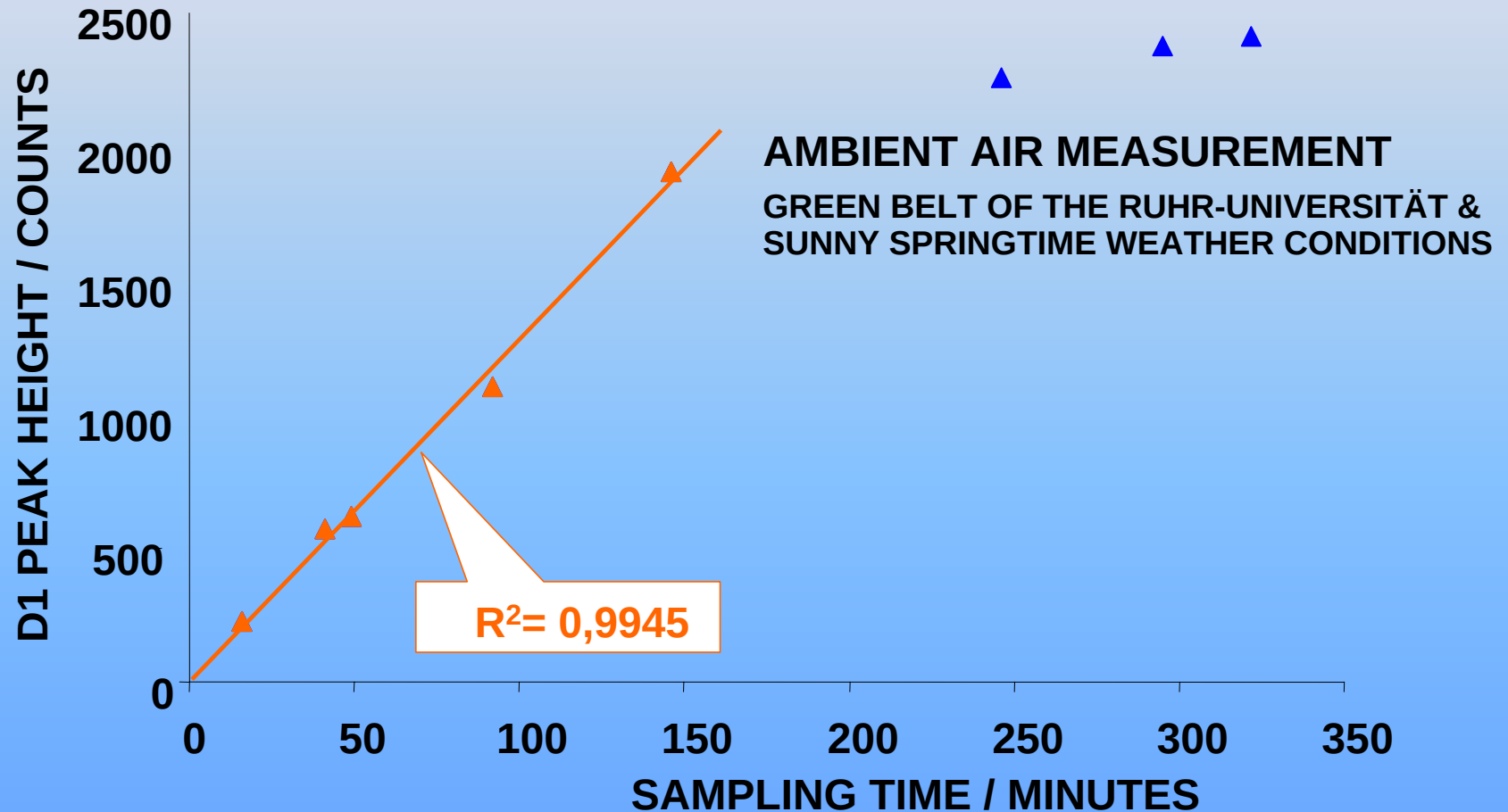
EVALUATION



NO SOOT



RAMAN INTENSITY VERUS SAMPLING TIME

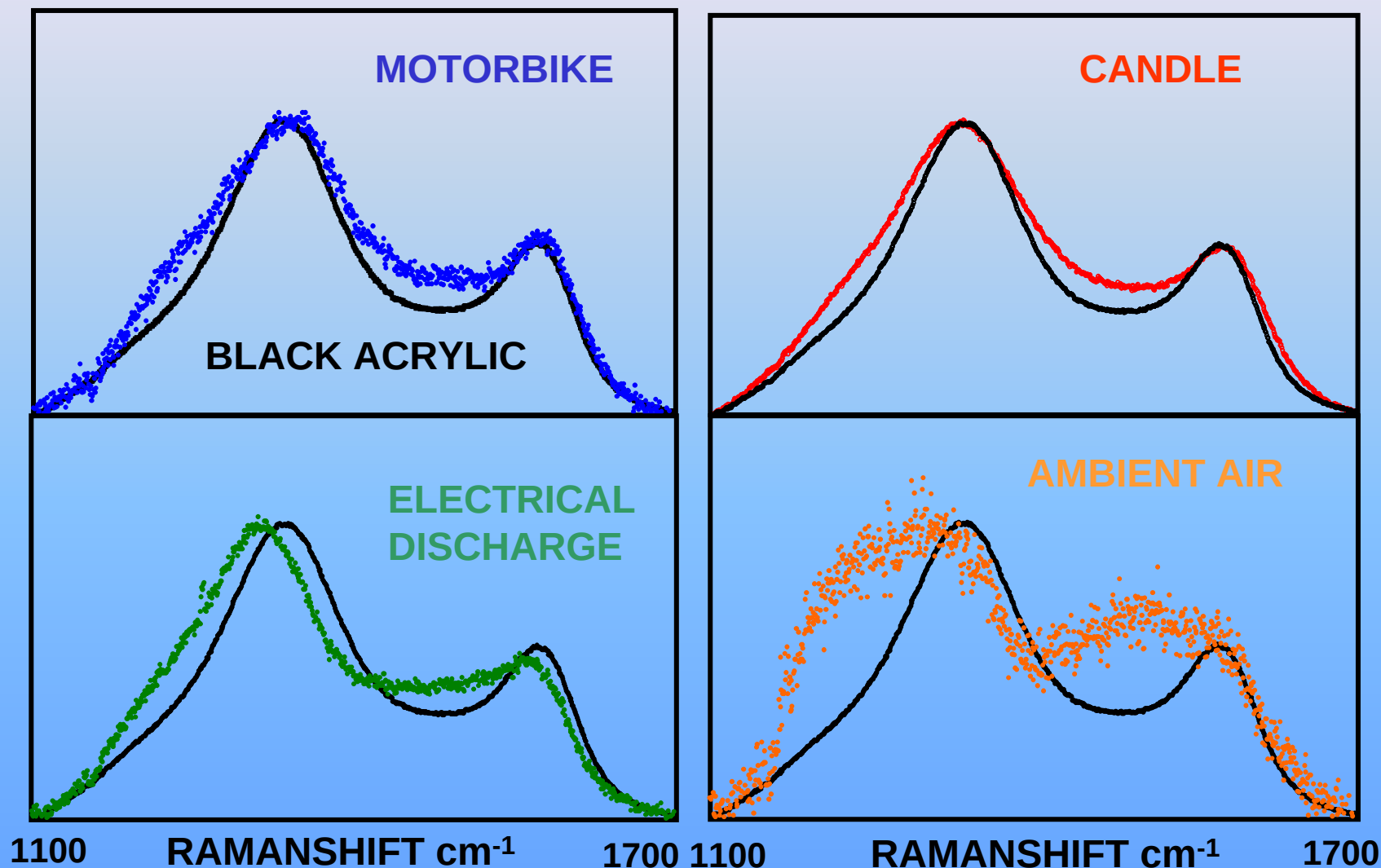


SOOT RAMAN SPECTRA

COMPARISON OF SOOT SPECTRA

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SOOT SPECTRA



SUMMARY AND OUTLOOK

PORTABLE RAMAN SOOT SPECTROMETER

RAMAN SPECTRA FROM SOOT WHILE SAMPLING

**QUANTITATIVE RAMAN SPECTRA FROM
SOOT ON FILTER**

EFFECT OF SOURCE ON RAMAN SPECTRUM

OUTLOOK

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SUMMARY & OUTLOOK

IMPROVEMENT OF SENSITIVITY

CALIBRATION

END OF PRESENTATION

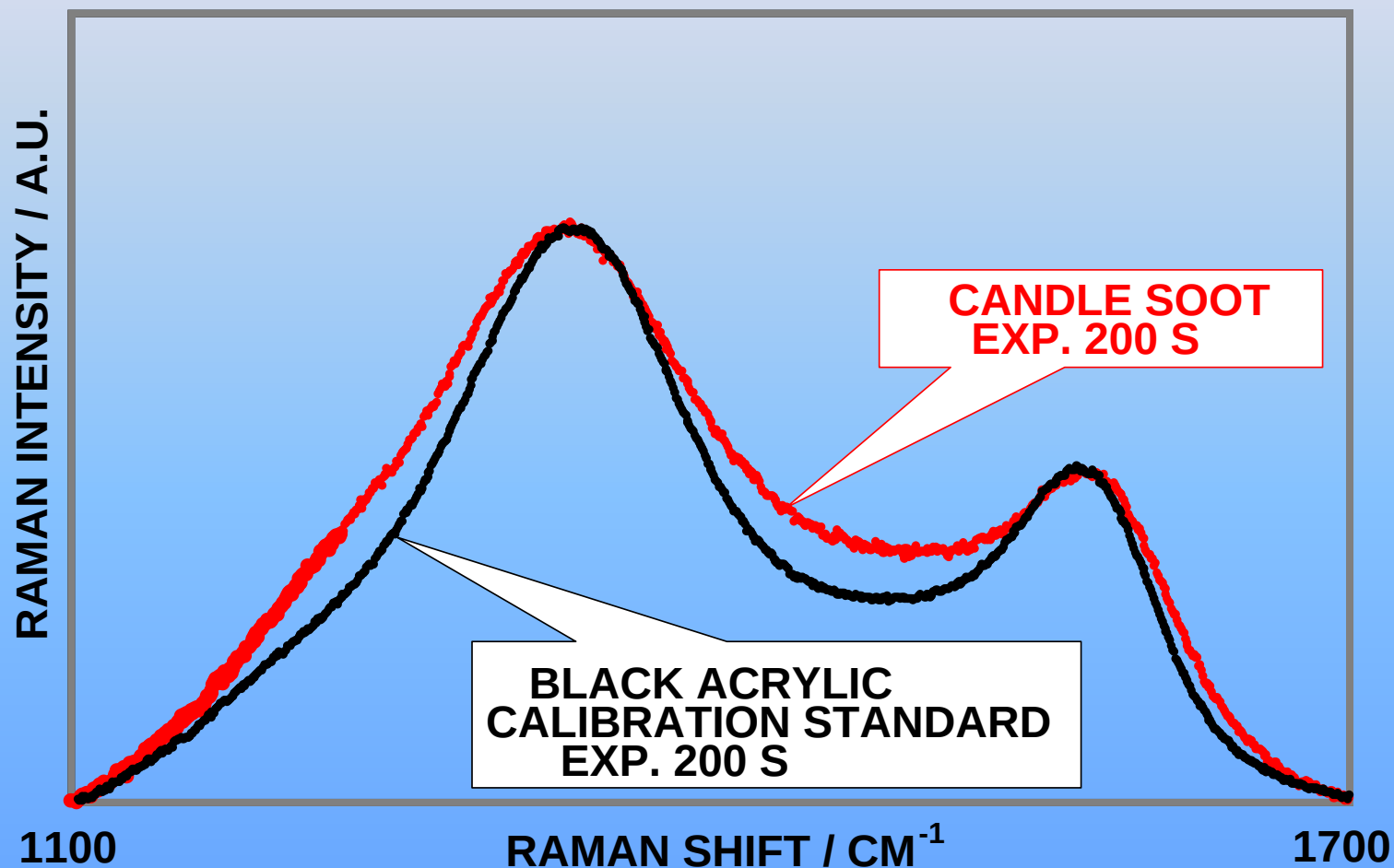
PROPERTIES

IDENTIFICATION OF OTHER COMPONENTS

CANDLE SOOT

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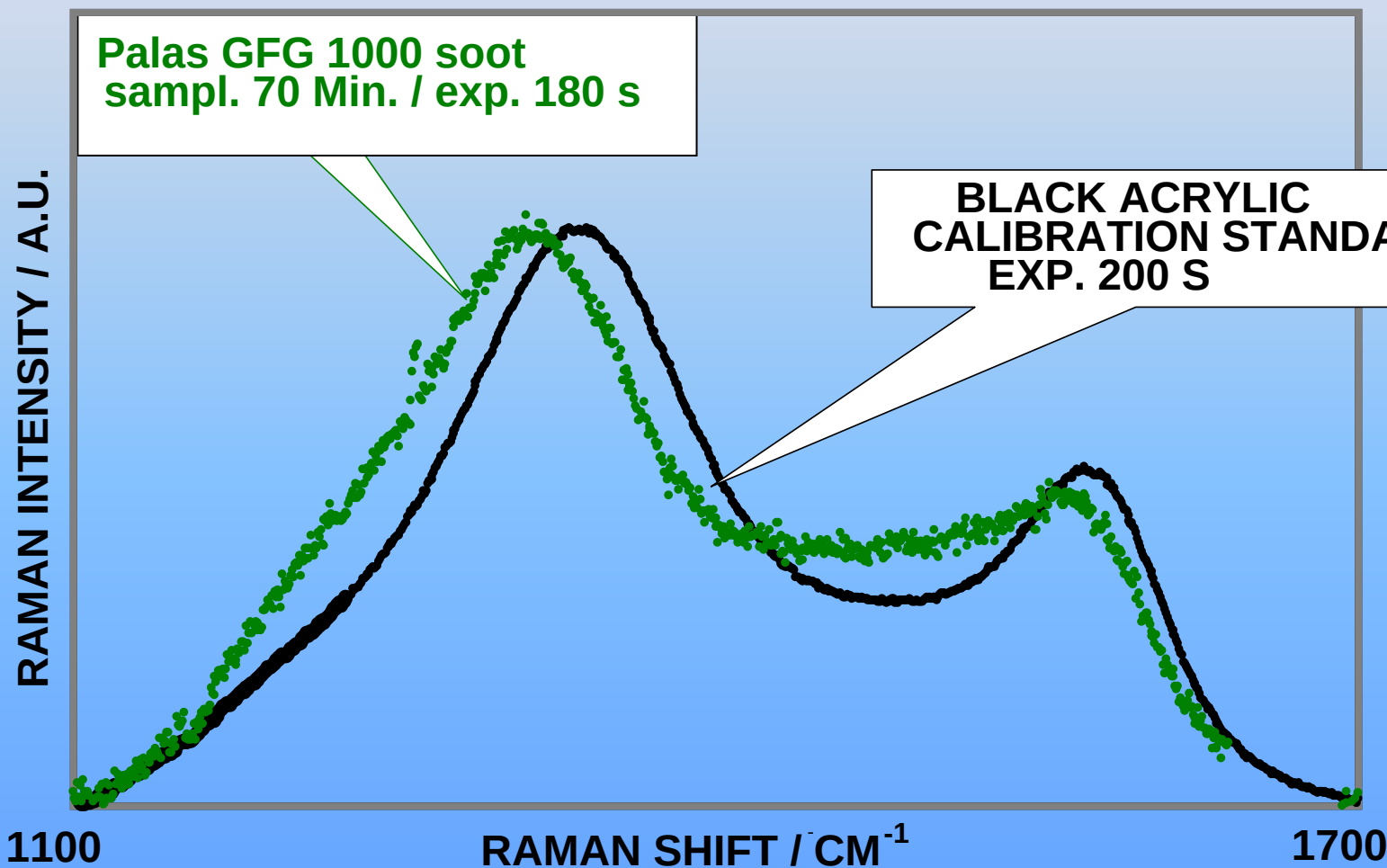
SOOT SPECTRA

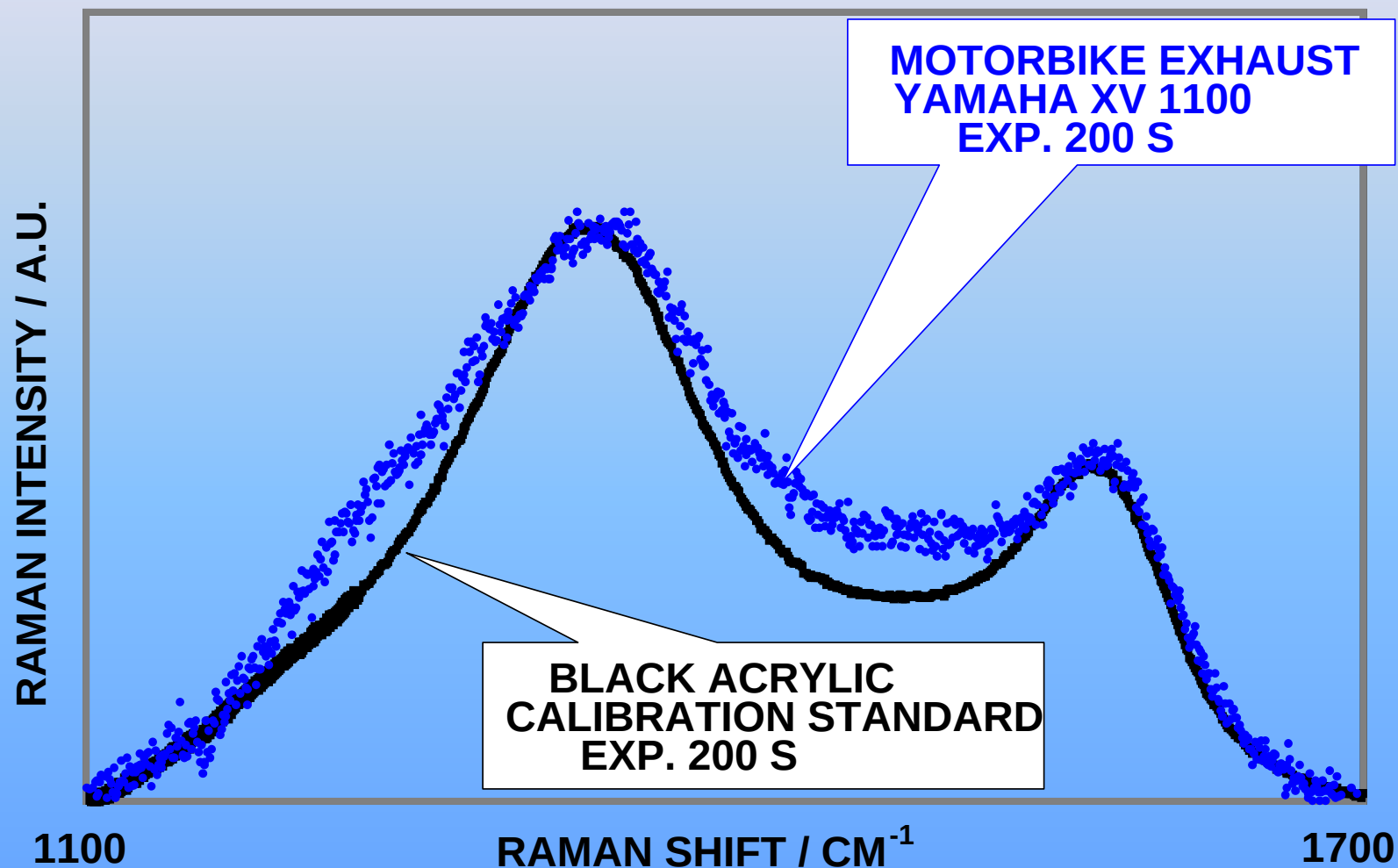


ARC DISCHARGE

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SOOT SPECTRA





AMBIENT AIR

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SOOT SPECTRA

