

# SAMPLE PREPARATION WITH EMILIE™

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## 1 INTRODUCTION

Sample preparation and introduction is always a main concern with any analytical technique. The EMILIE™ NEMS-FTIR technique is unique in that its central part - the nanomechanical chip - is used both as a sample holder and as a sample detector. Sample deposition directly on the sensing element allows for the extremely high sensitivity of the technique.

## 2 SAMPLING STRATEGIES

Several strategies are available to deposit samples at the surface of the EMILIE™ chip. Samples can be deposited on the EMILIE™ chip by aerosol or drop-casting techniques as shown in Fig.1. It is to be noted that because measurements are performed in vacuum, only non-volatile and semi-volatile analytes can be analyzed with EMILIE™. The EMILIE™ chip is made of a chemically and heat resistant silicon nitride ceramic. The important factors to consider when elaborating a sampling strategy are:

- The EMILIE™ chip should not be overloaded with sample. The maximal sample amount, depending on the analyte, is a few hundred nanograms.
- Procedures that may harm the mechanical integrity of the membrane at the center of the EMILIE™ chip should be avoided.
- Procedures that may affect the tensile stress of the EMILIE™ chip should be avoided.

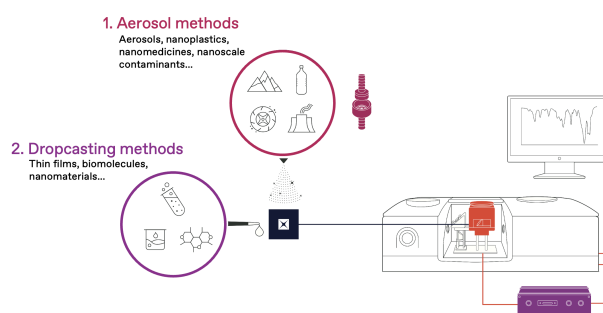


Figure 1: Sample deposition on the EMILIE™ chip. Analyte can be collected on the EMILIE™ chip either by aerosol sampling or drop casting.

The sampling strategy depends on the form of the analyte. With EMILIE™, it is possible to sample analytes in various forms, including aerosol, powder, dispersion, or solution.

- **Aerosol (particle size from 10 nm to 1500 nm):** Can be sampled directly by the aerosol method. See section 2.1.
- **Powder:** Can be aerosolized and sampled by the aerosol method (see section 2.1) or dispersed in a liquid and drop cast (see section 2.2), respectively.
- **Dispersion:** Can be nebulized and sampled by the aerosol method (see section 2.1) or drop casted (see section 2.2) directly.
- **Solution:** Can be nebulized and sampled by the aerosol method (see section 2.1), or drop casted (see section 2.2) directly.

