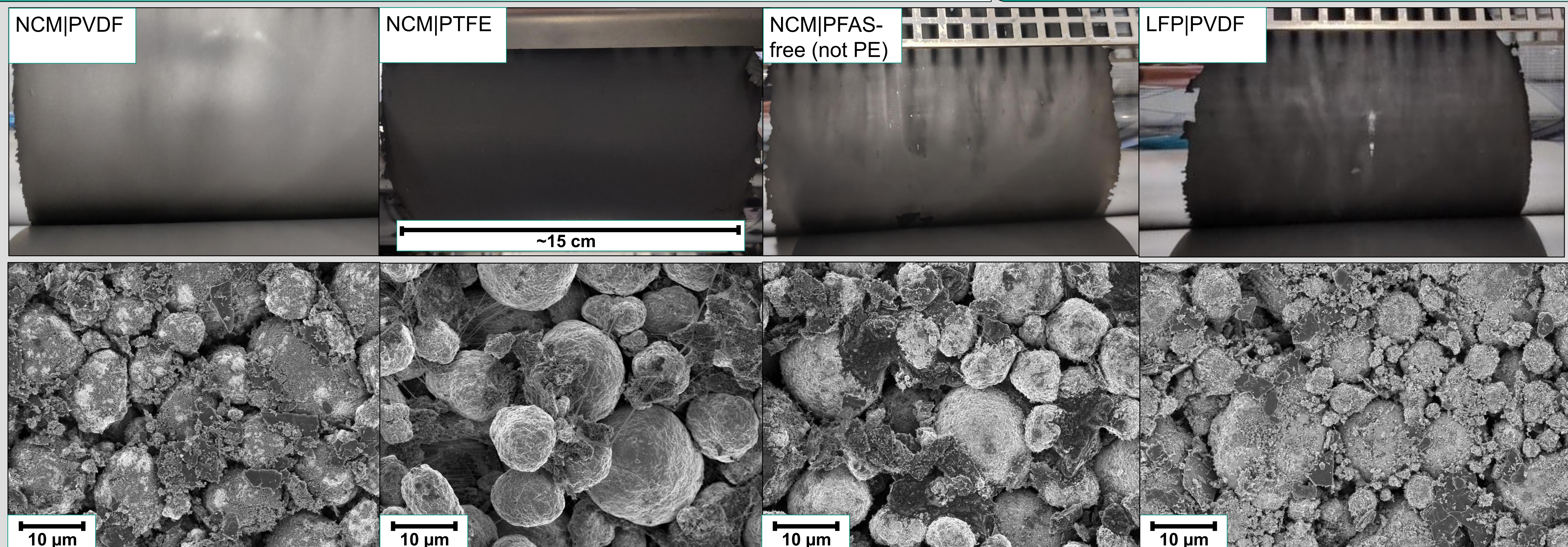


Confidential

Binder and Active Material Variations & In-line Analytics

Pirmin Koch, Sebastian Boldt, Werner Bauer

Binder Variation



- PVDF and PFAS-free do not fibrillate during mixing

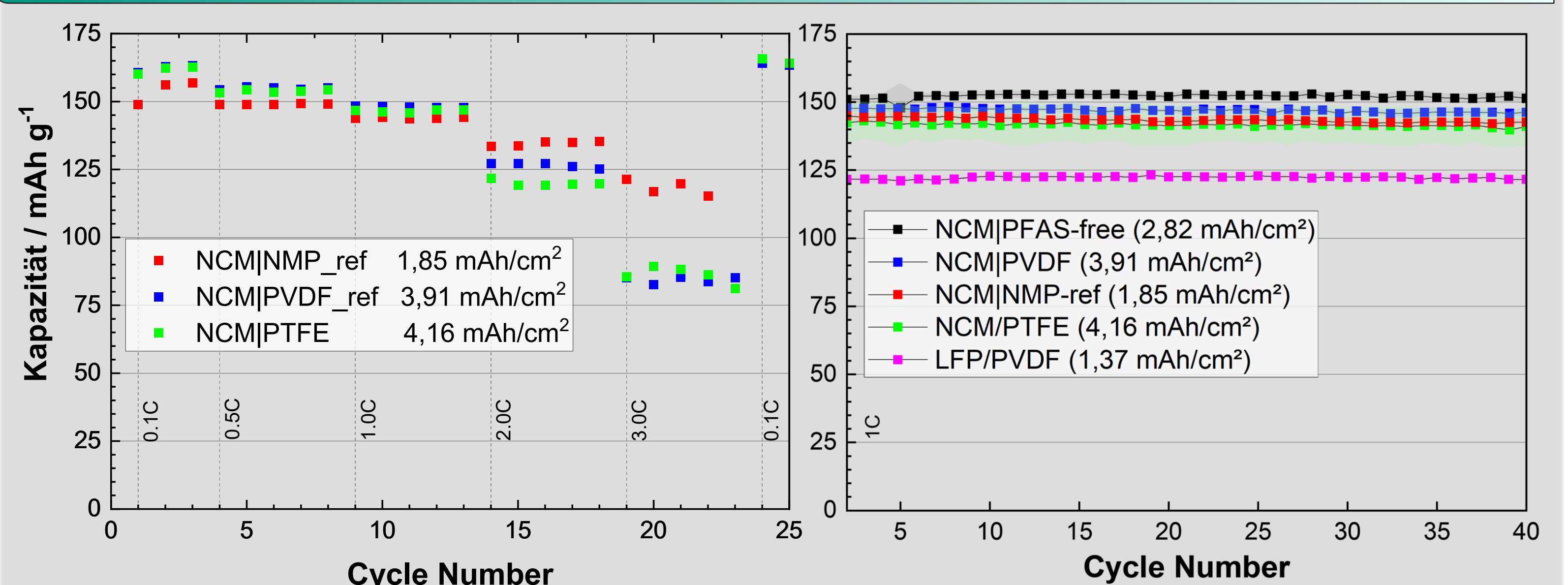
AM Variation

- PVDF and PFAS-free electrodes can form short filaments

Sample	NCM PVDF	NCM PTFE	NCM PFAS-free	LFP PVDF
Thickness / µm	83.4	90.2	67.6	64.5
Theoretical porosity / %	30.0	33.4	34.2	49.8
Areal capacity / mAh/cm ²	3.91	4.16	2.82	1.37
Composite volume resistivity* / Ωcm	6.9	27.3?	57.1?	12.4
Adhesion strength / N/m	43.9	25.6	20.4	9.14 ⚡

- Shear measurements at 15 kPa show no clear trend (yet)!, difference in calendaring are noticeable ⚡

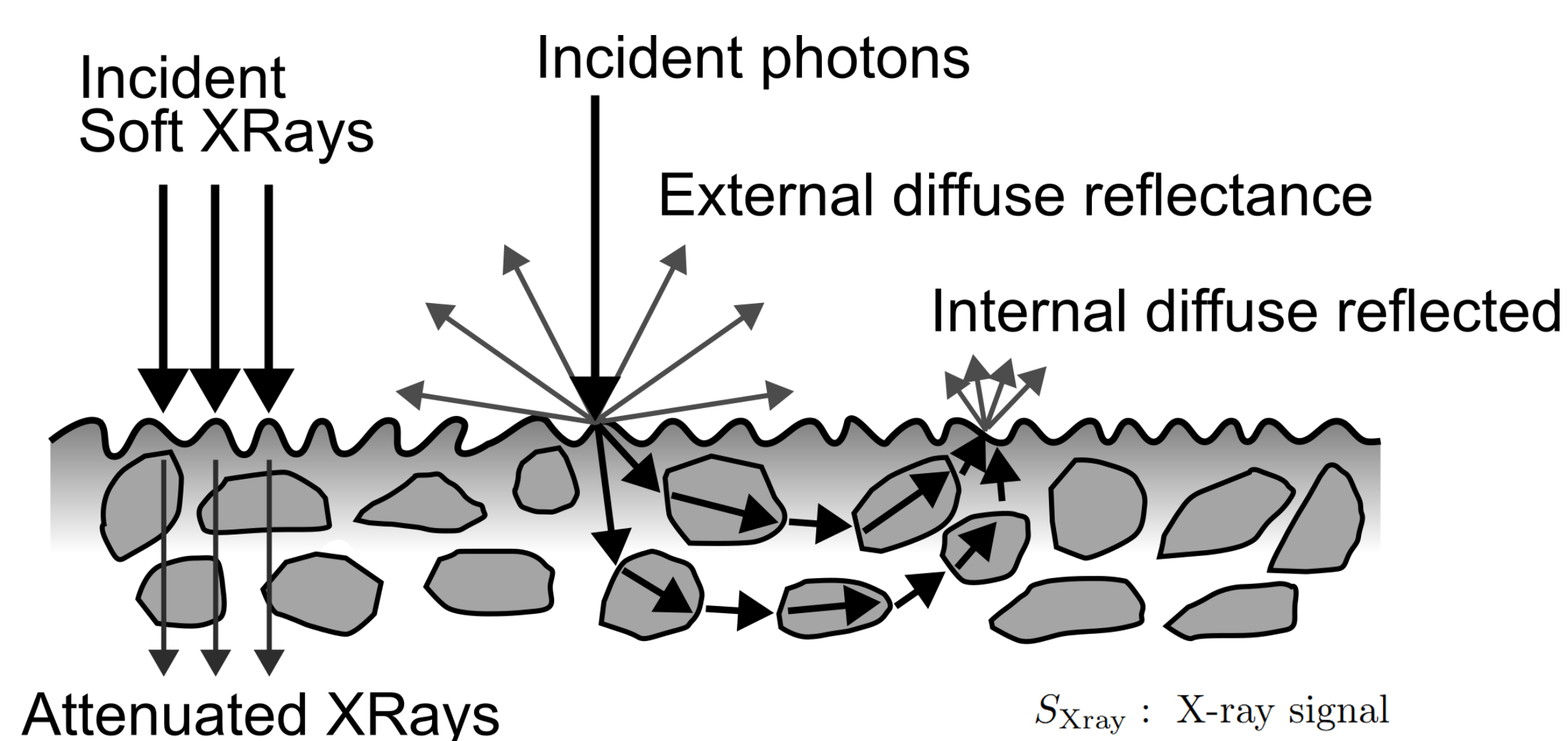
Electrochemical data



- PFAS-free binder has room for improvement

In-line Analytics for electrodes

Spectral reflectance and Xray attenuation



$$R = f_R(\lambda, \sigma, \phi, n)$$

$$S_{Xray} = f_{Xray}(t, \phi)$$

S_{Xray} : X-ray signal
 R : Reflectance
 t : Layer thickness
 ϕ : Porosity
 λ : Wavelength
 σ : Surface roughness
 n : Optical properties

