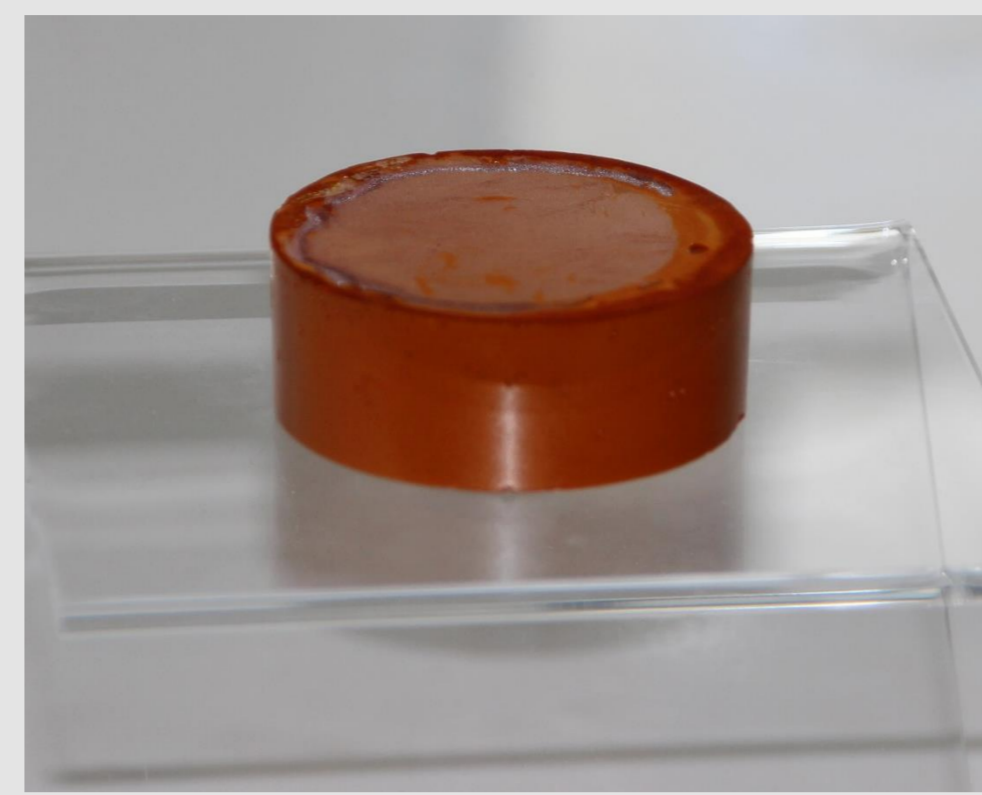
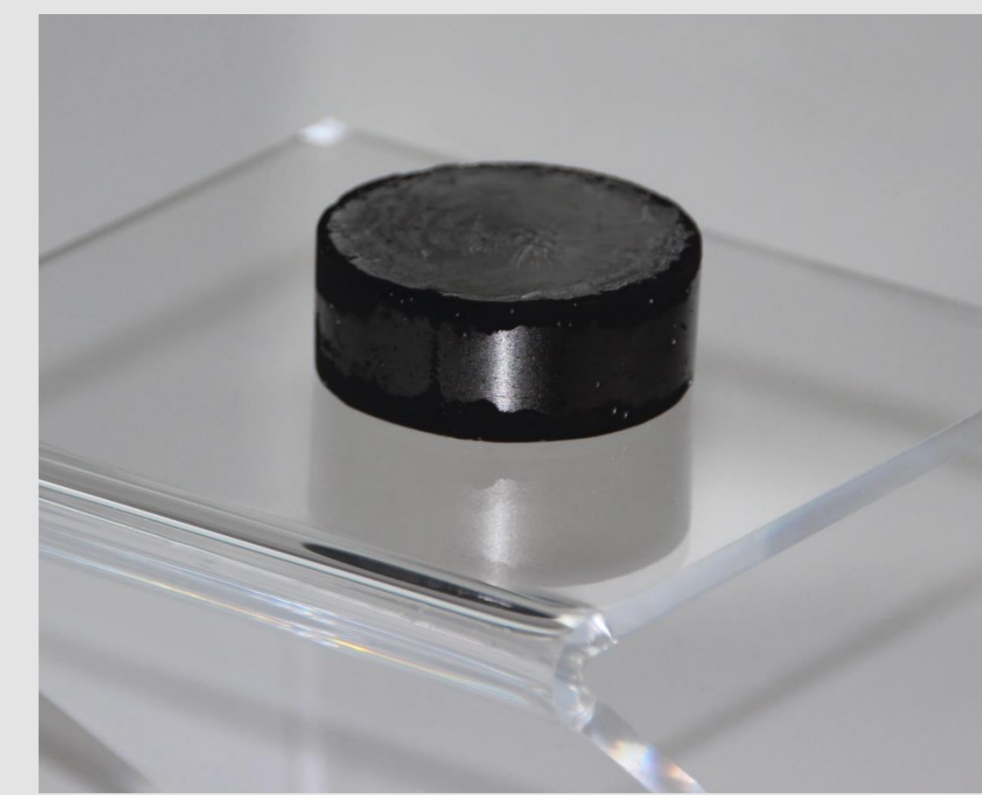


INTRODUCTION

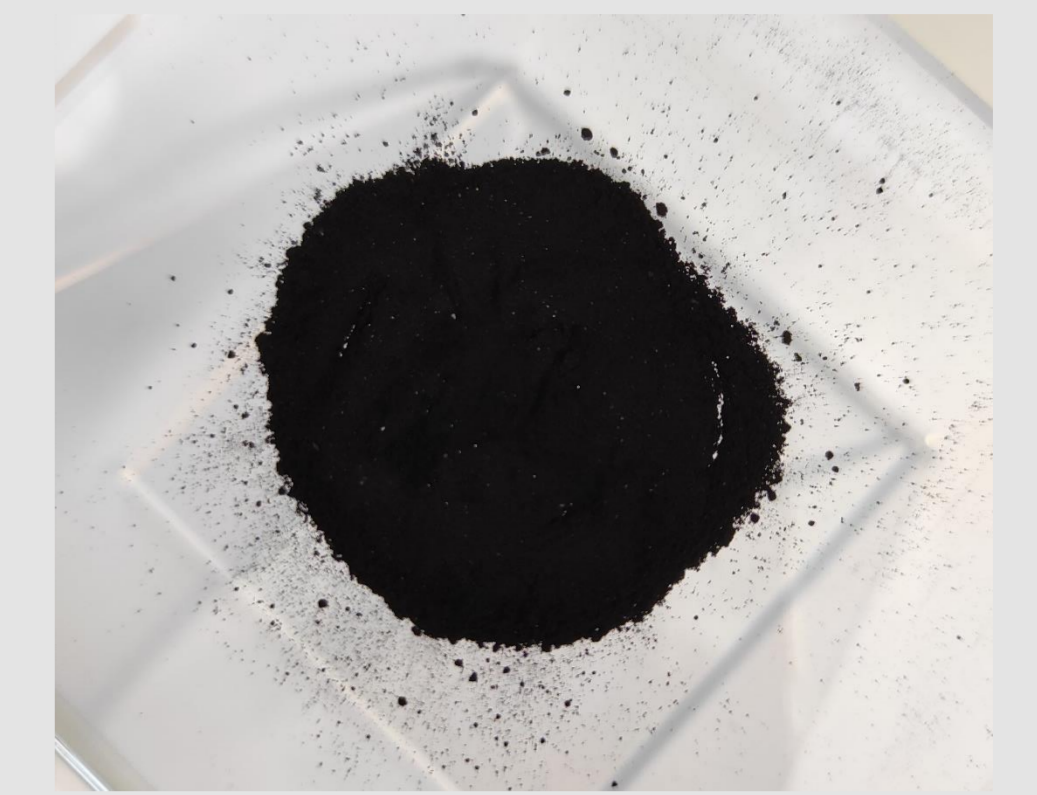
- Three-dimensional, open porous solid materials
- Based on organic aerogels (e.g. resorcinol-formaldehyde)
- Tunable microstructure of carbon aerogels
- Well controlled porosity and pore size
- Surface area about 500-2000 m²/g
- High electrical conductivity
- Subsequent structural optimization through carbonization, activation and doping



Resorcinol-Formaldehyde Aerogel

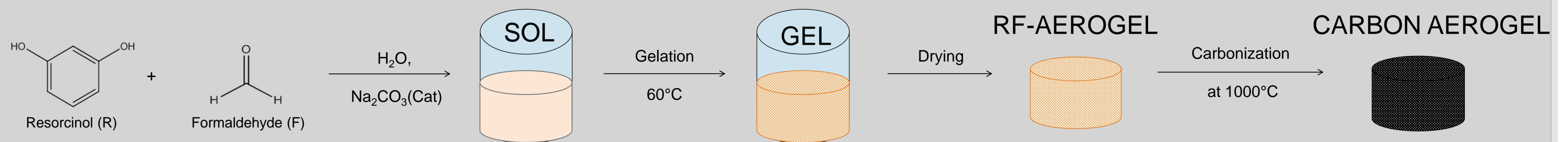


Monolithic Carbon Aerogel



Carbon Aerogel Powder

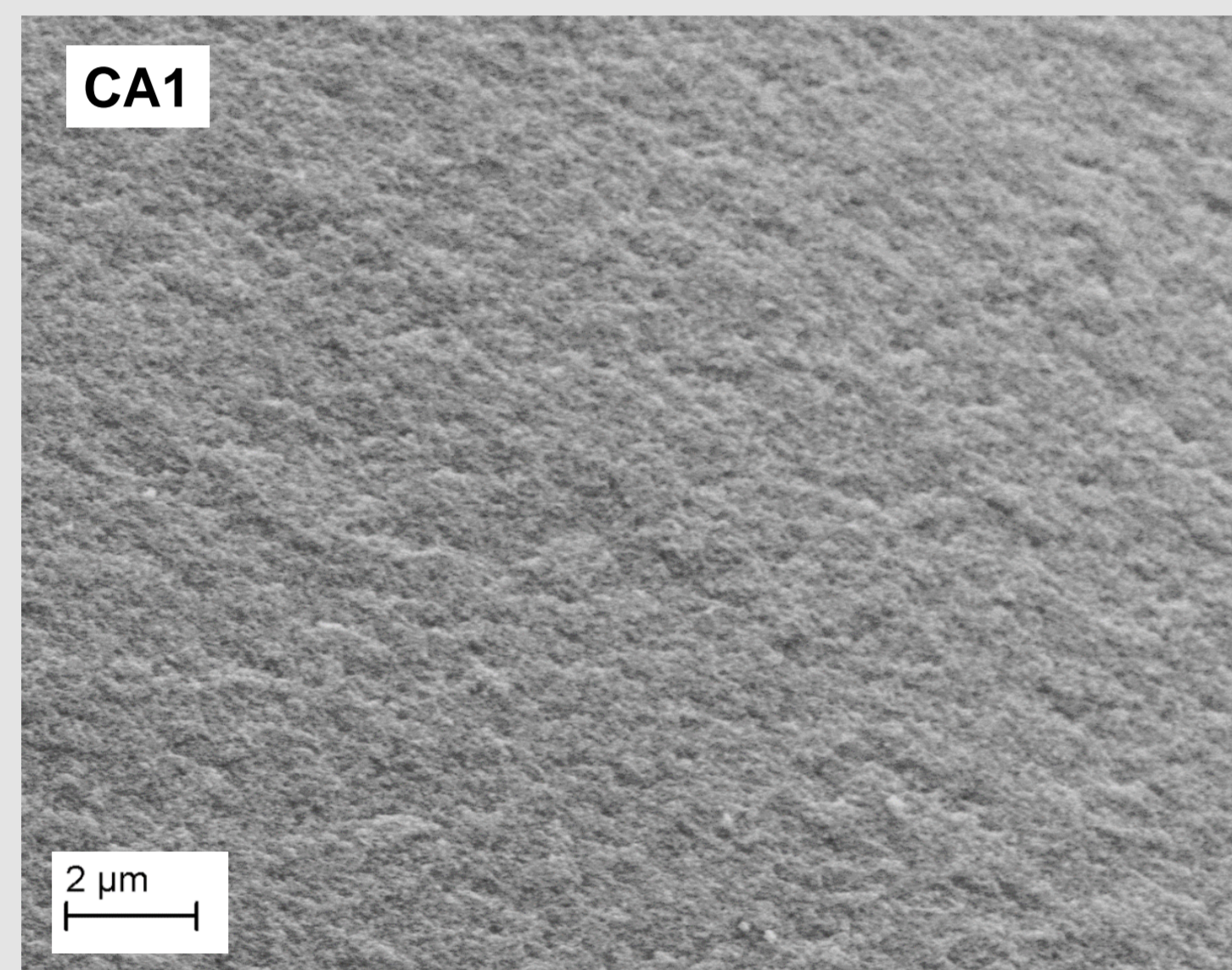
SYNTHESIS



Synthesis parameters of the different carbon aerogels:

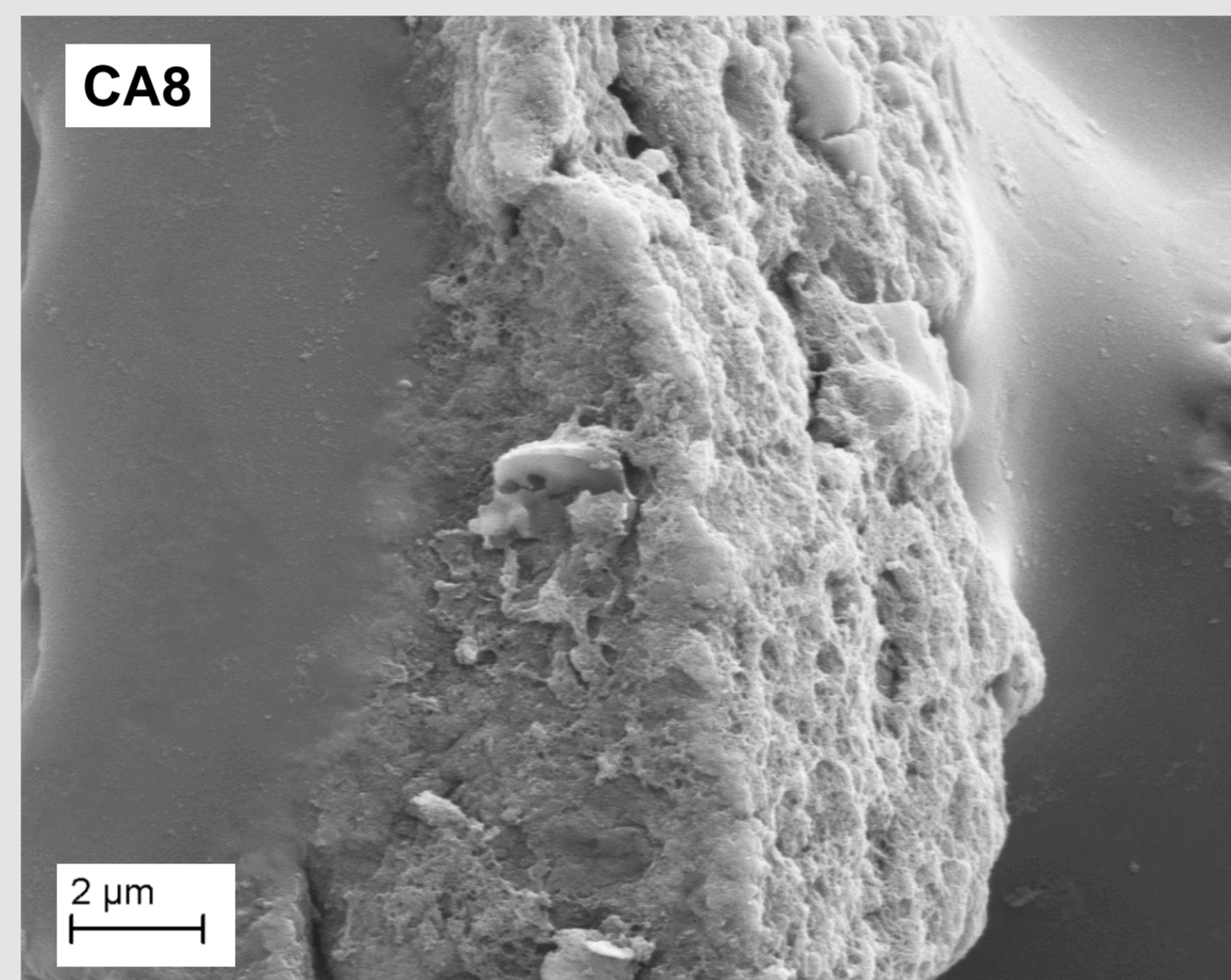
Carbon aerogel	R:Cat molar ratio	R:W molar ratio	R:F molar ratio	Drying conditions	Carbonization conditions	Nitrogen Doping/Activation
CA 1	250	0.038	0.74	Supercritical CO ₂	1 h, N ₂	-
CA 7					2 h, N ₂	2h, CO ₂
CA 8					1 h, N ₂	Melamine/K ₂ CO ₃
CA 9					1 h, N ₂	NH ₃ (950°C)
CA 11	50	0.008	0.5	Ambient pressure at 80 °C	1 h, N ₂	Melamine/K ₂ CO ₃
CA 30	1500	0.044	0.74		2 h, N ₂	2h, CO ₂

RESULTS & DISCUSSION



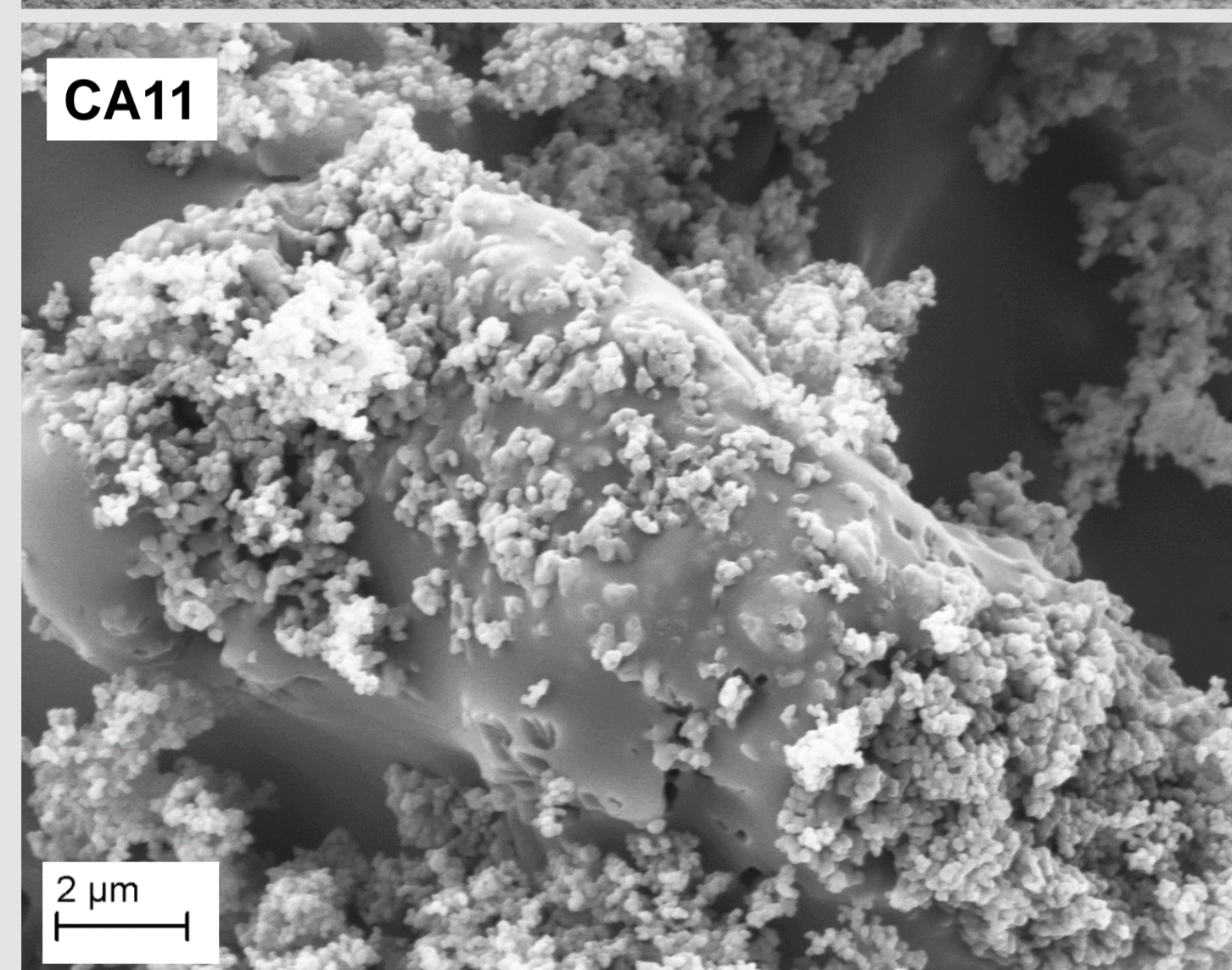
CA1

2 μm



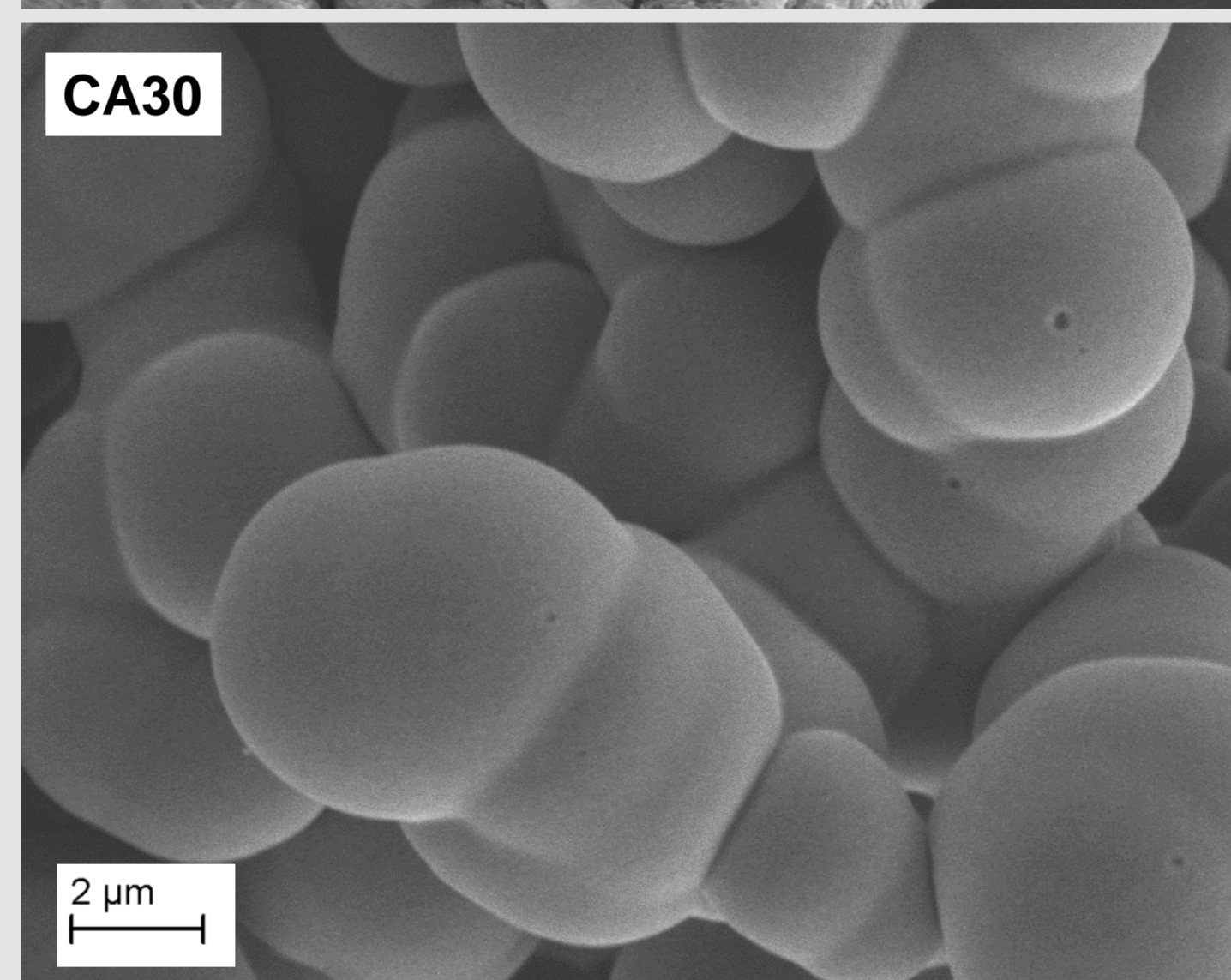
CA8

2 μm



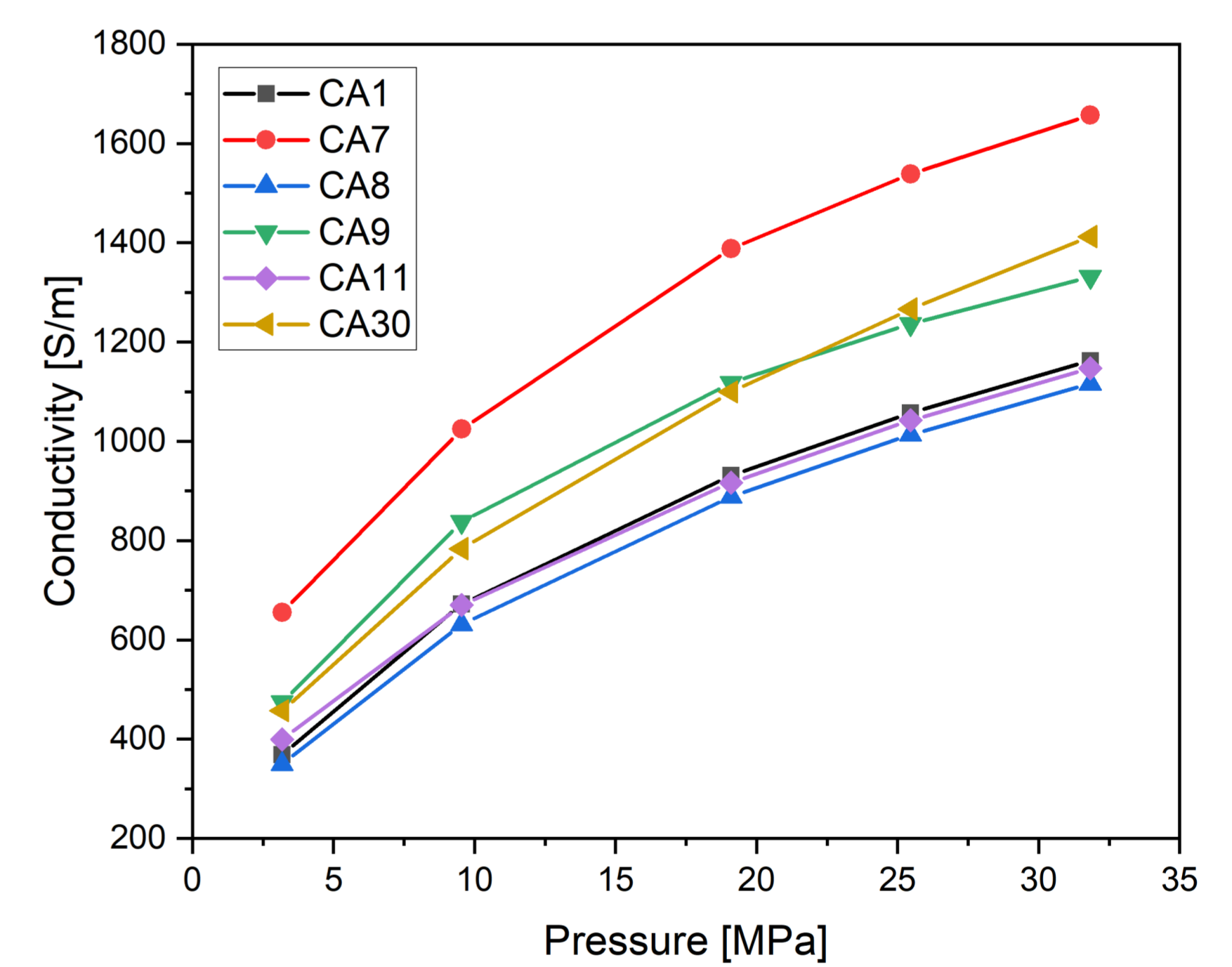
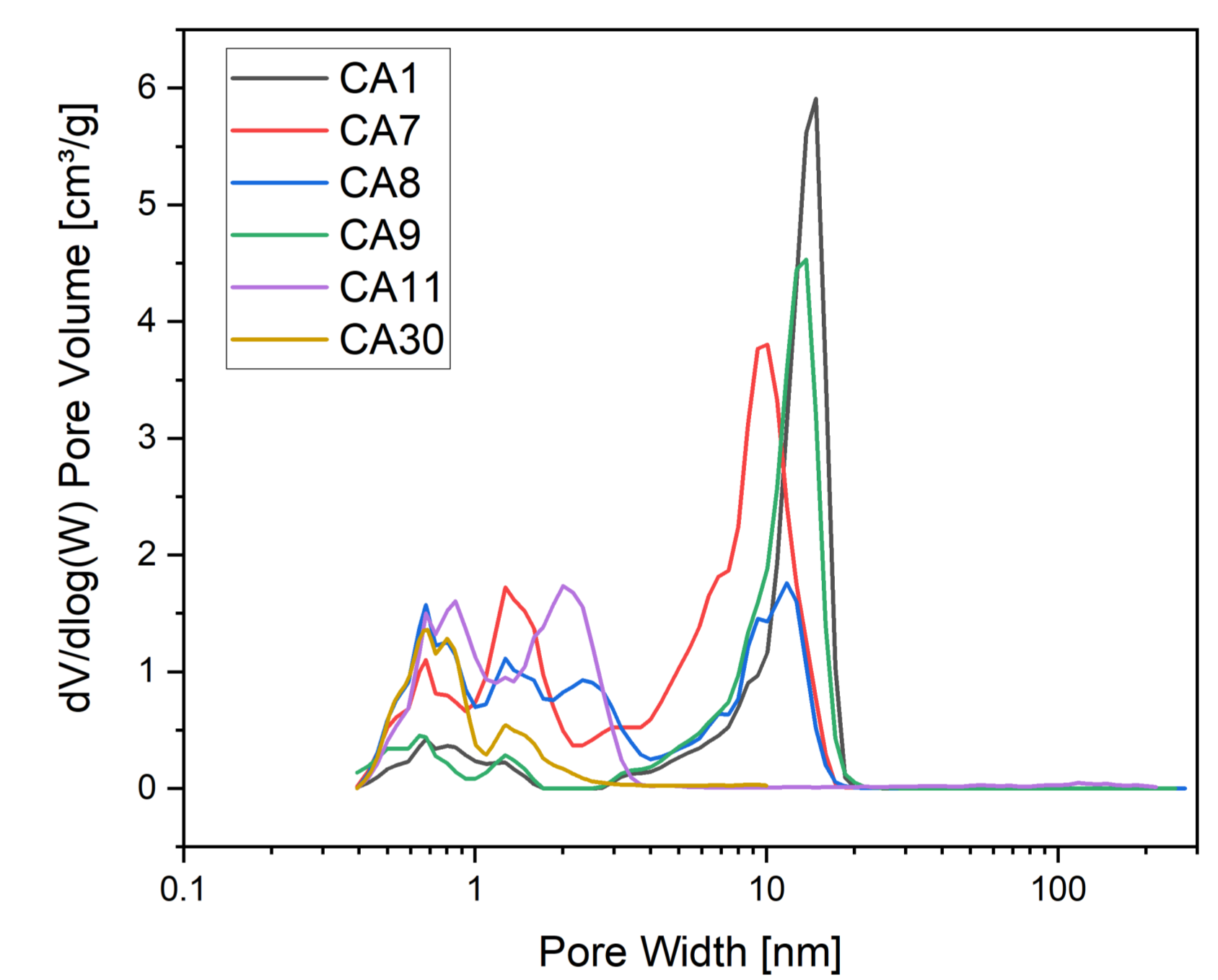
CA11

2 μm

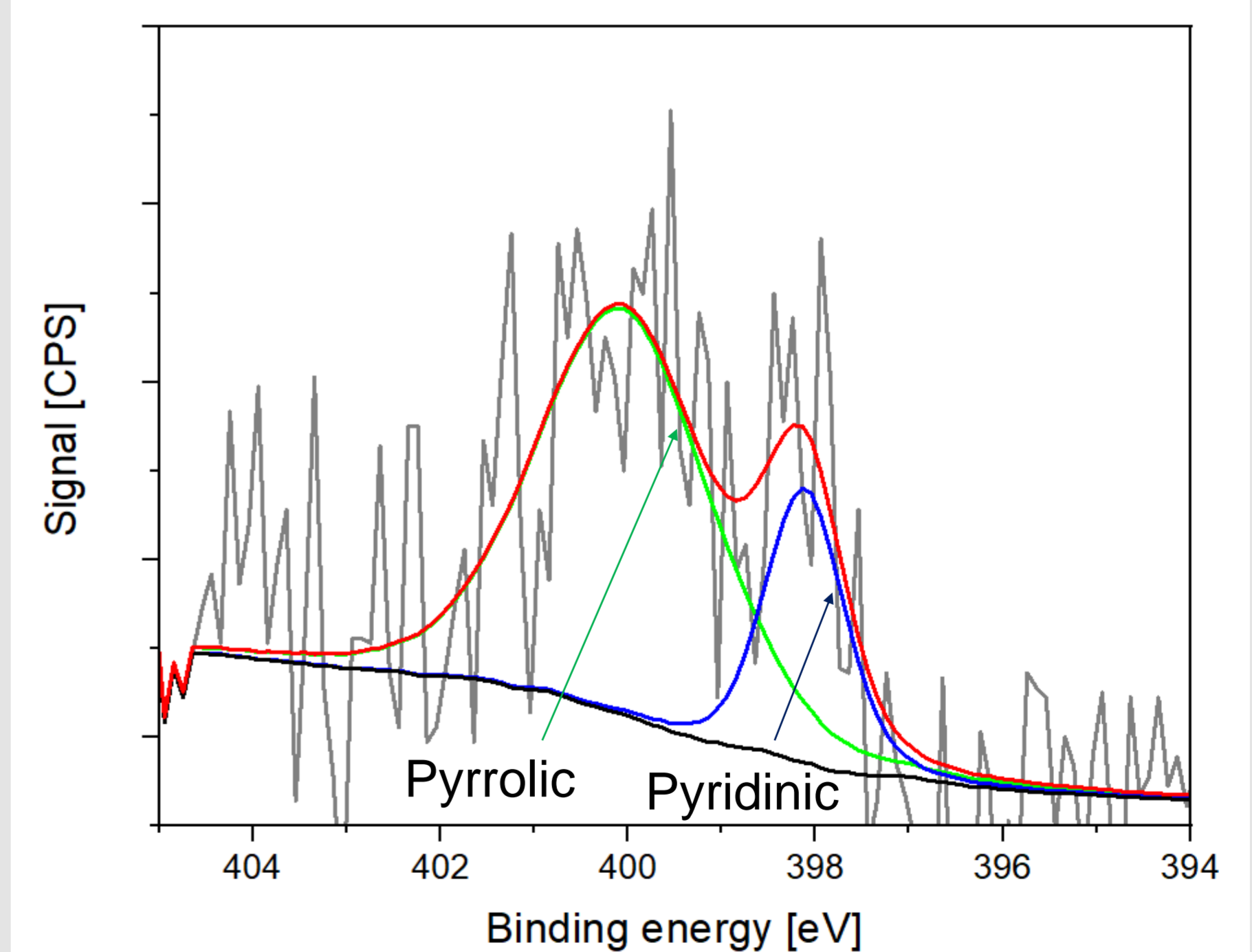


CA30

2 μm



Carbon aerogel	V _{micro} [cm ³ /g]	V _{meso} [cm ³ /g]	A _{BET} [m ² /g]	Nitrogen content	Conductivity at 1 kN [S/m]
CA1	0.13	1.05	652	-	369
CA7	0.31	1.35	1264	-	655
CA8	0.77	0.60	2175	0.9	350
CA9	0.23	1.07	965	3.5	474
CA11	1.06	0.13	2414	1.3	400
CA30	0.52	0.04	1349	-	457



CONCLUSIONS

- Broad range of properties of carbon aerogels
- Preparation of microporous, mesoporous or micro-mesoporous carbon aerogels
- Scalable synthesis for high amount of carbon aerogel
- Subsequent nitrogen doping (pyrrolic and pyridinic nitrogen)