Analysis of wood combustion particles

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Particles were sampled from a common wood fire. The particles were directly sampled on TEM grids for further analysis. Using an analytical TEM different four different particles could be distinguished based on their morphology and chemistry. These particle classes are presented in the slides 02-06

- 02: Organic particles:
  - rounded shape
  - no additional elements than already present in the background
  - sensitive to radiation damage
  - 200 – 300um in diameter

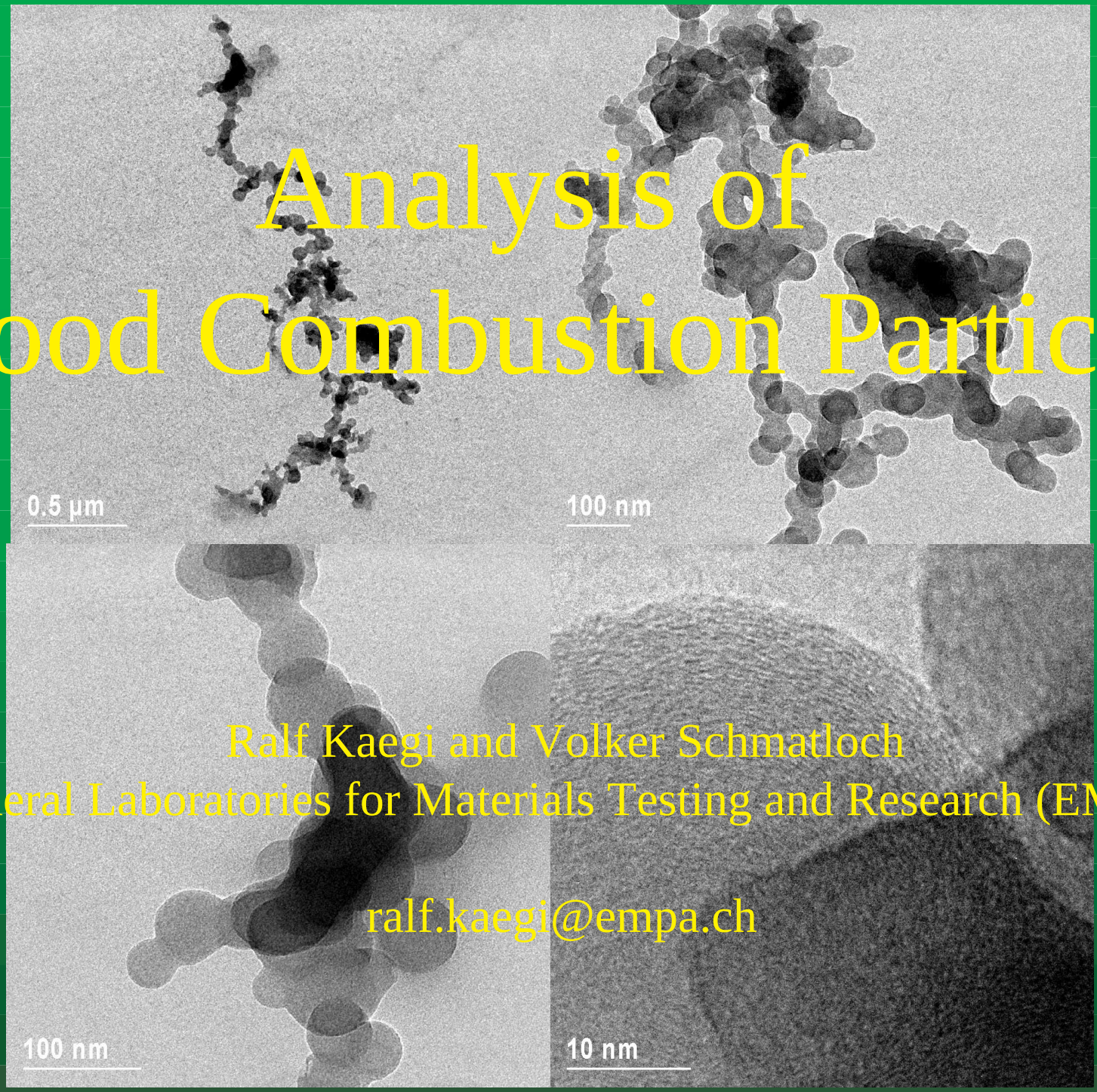
- 03: KCl-particles
  - almost crystal -like shape
  - consisting of K and Cl only
  - sensitive to radiation damage
  - 200 – 300um in diameter

- 04: 'multielement' particles
  - round shape
  - additional elements present: P, S, Cl, Ca, Na
  - very sensitive to radiation damage
  - 200 – 300um in diameter

- 05, 06: 'common' soot
  - fractal-like shape
  - heterogeneous chemistry, some spots contains Cl, K,S
  - stable under the electron beam
  - variable size (from 50nm upwards)

It has been shown, that there is a variety of different particle classes resulting from wood combustion. Thus, an evaluation of the toxicity of the particles from wood combustion must include the complexity of the particles at the basic level of the single particle.

Analysis of Wood Combustion Particles



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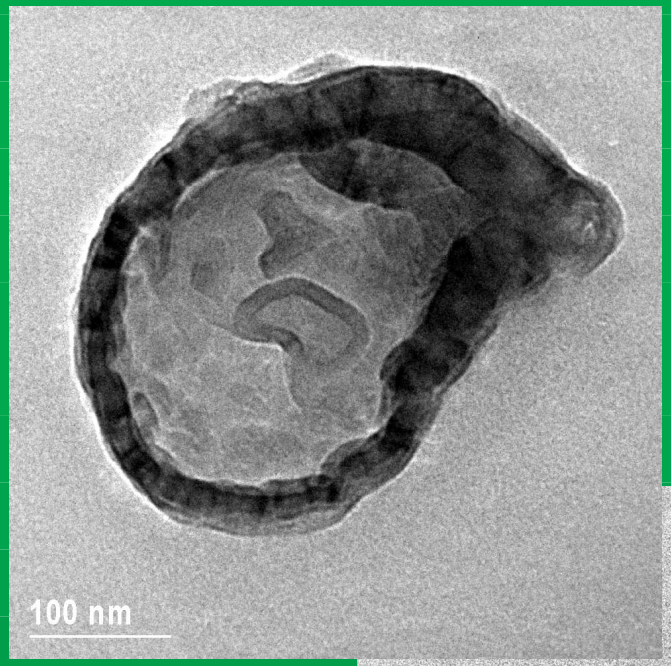
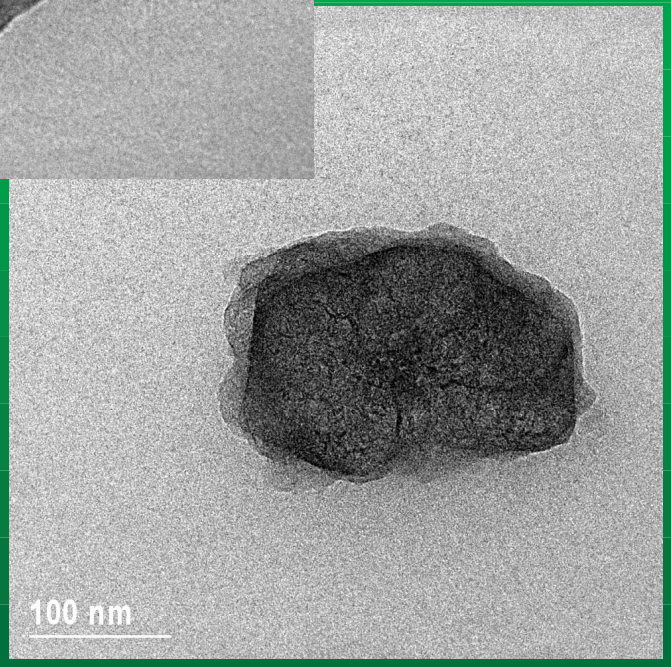
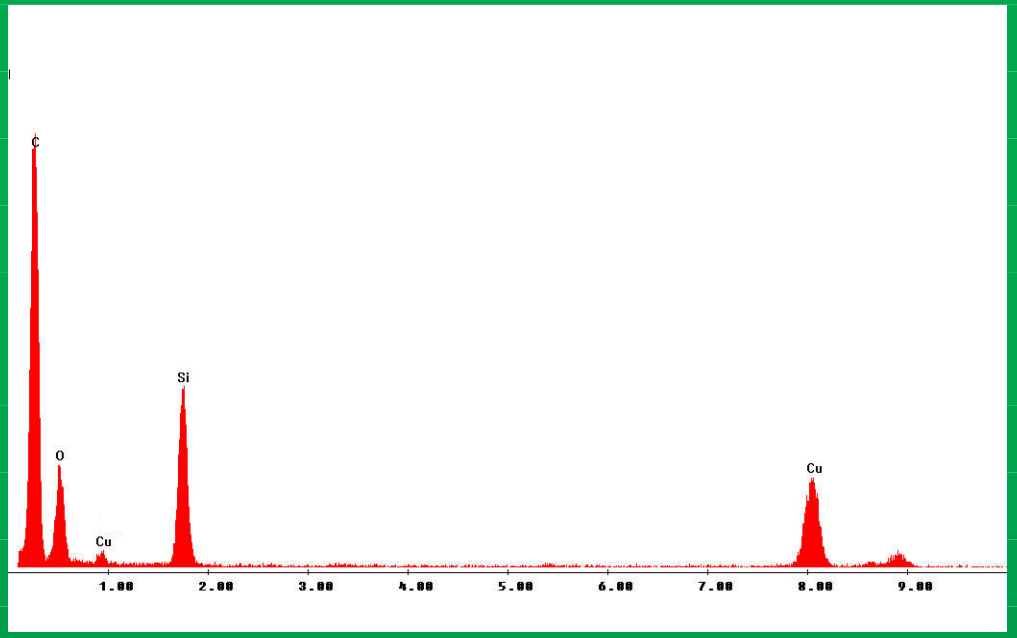


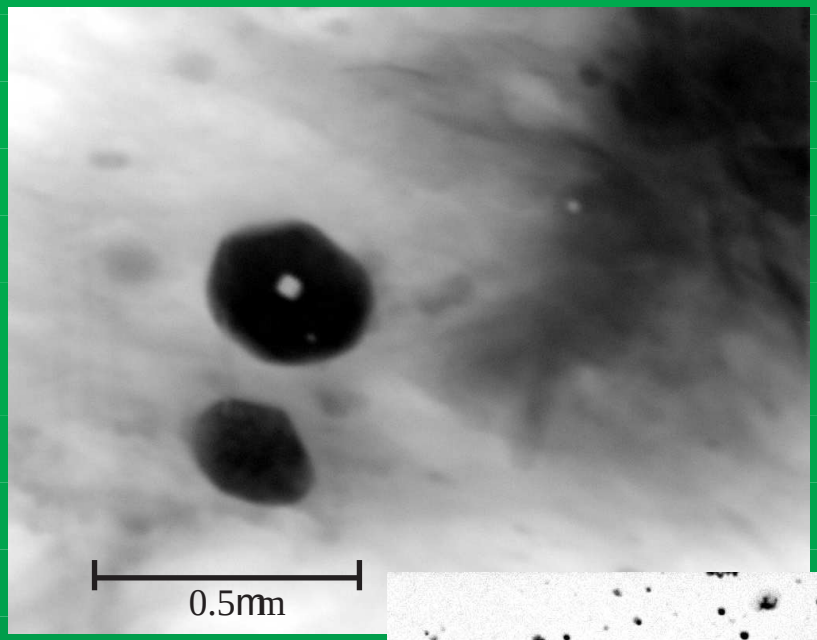
TEM



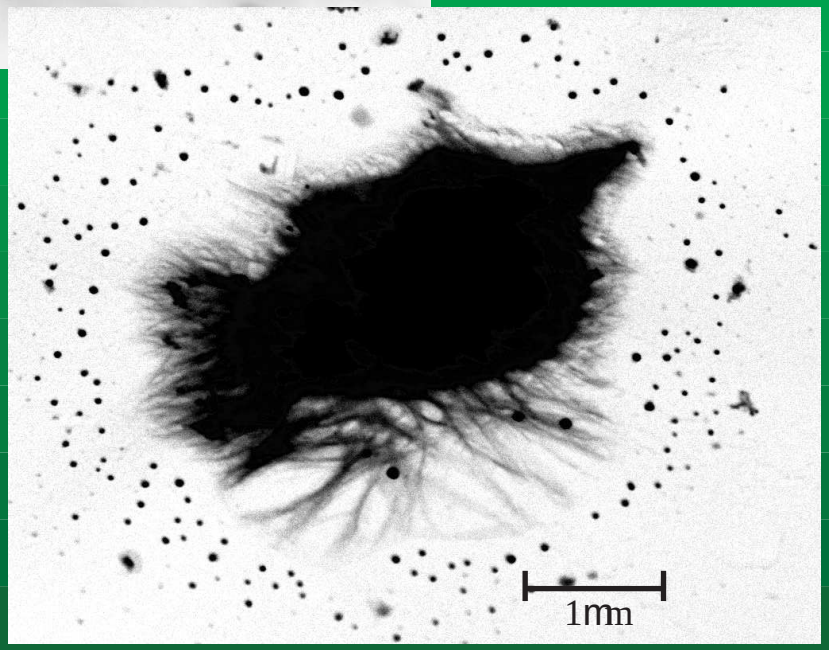


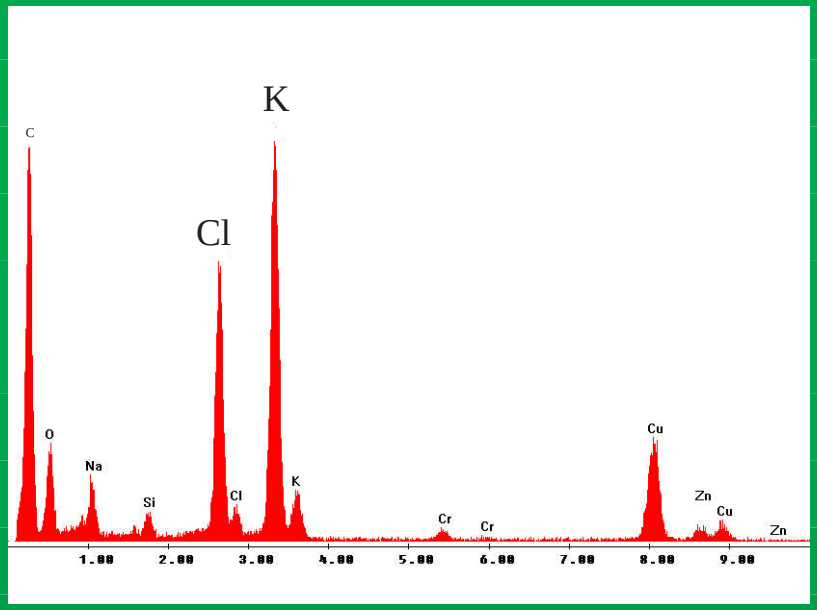
EDS

'organic' particles



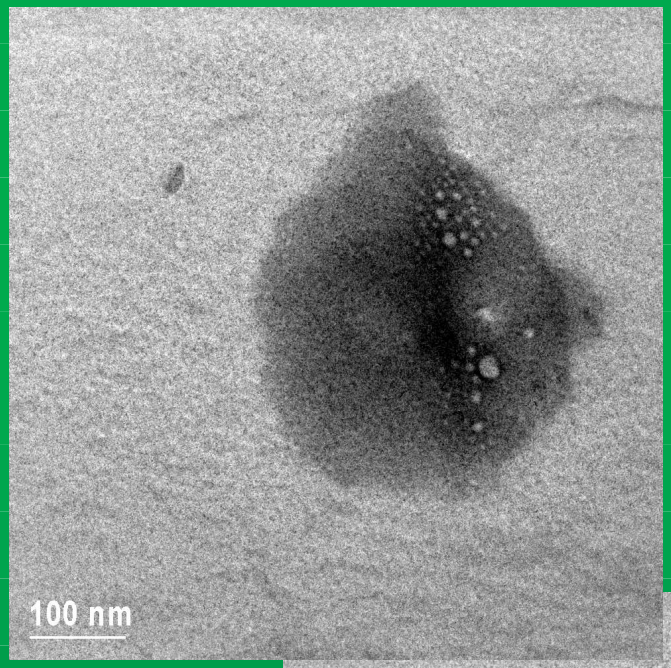
TEM

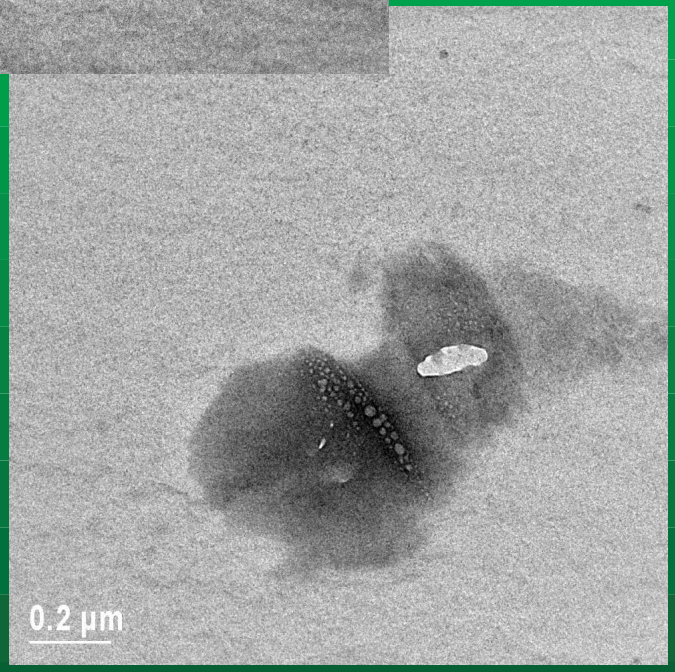




EDS

'KCl' particles





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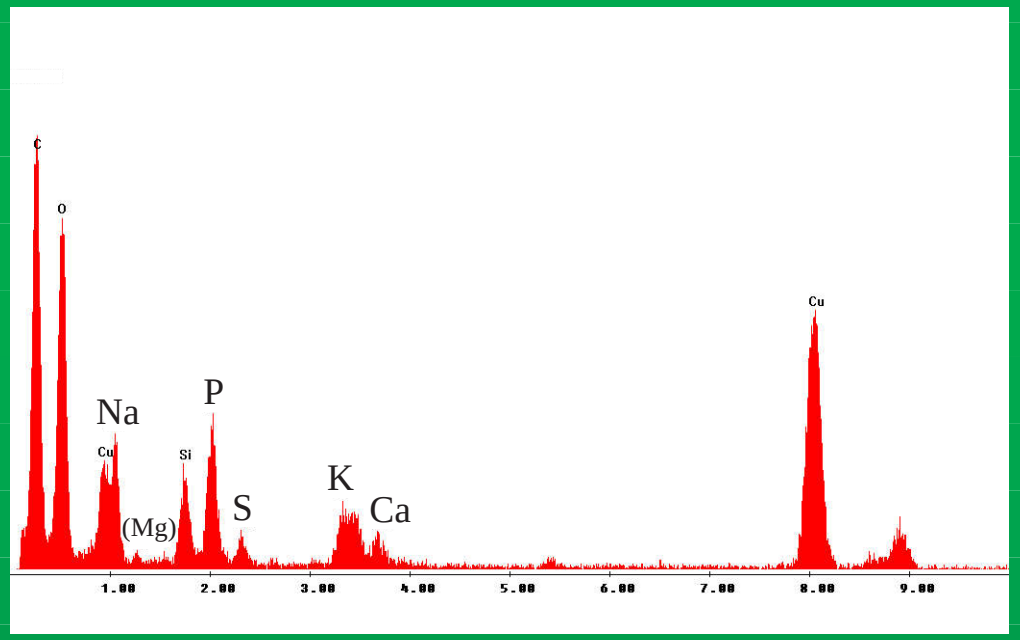
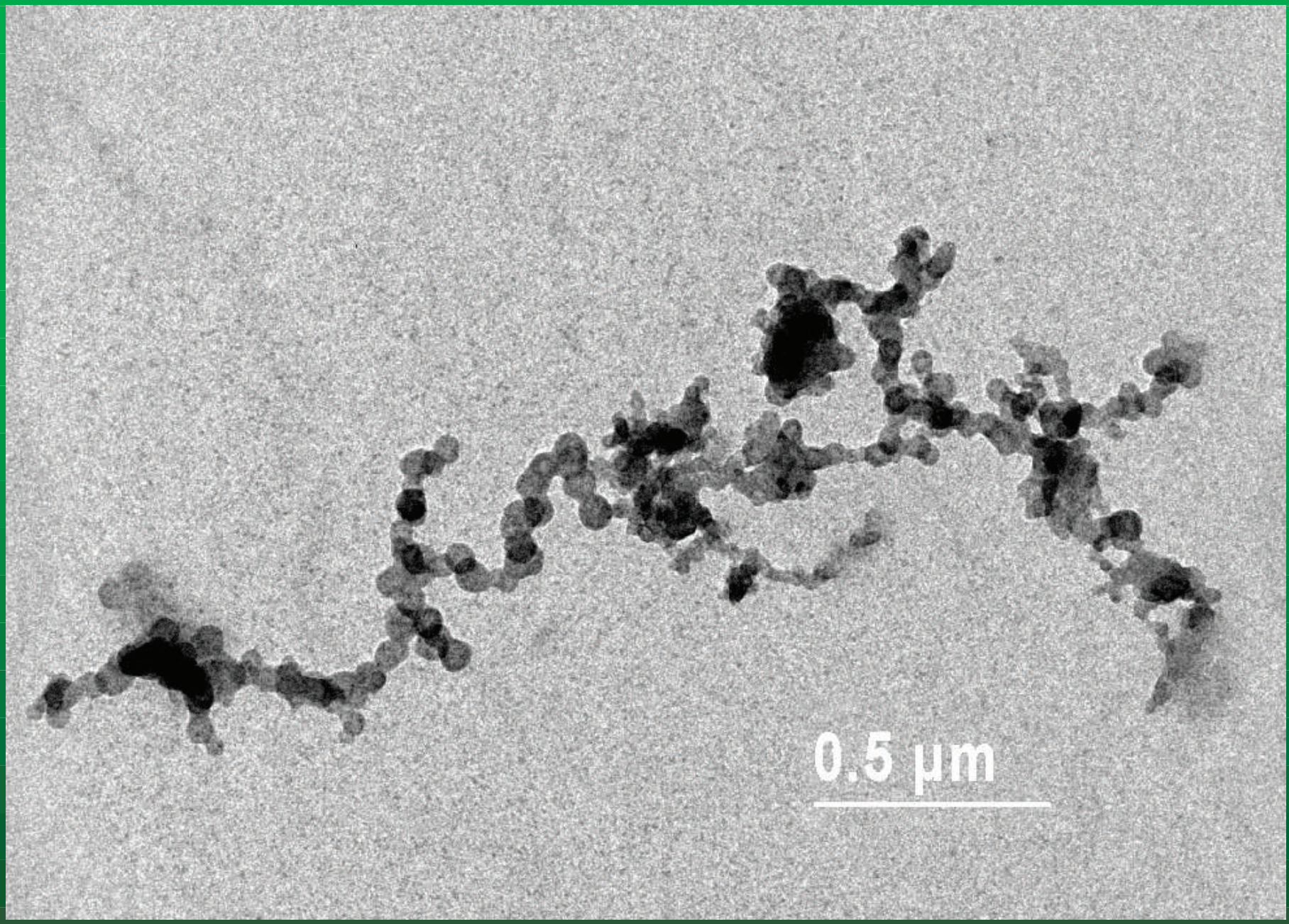


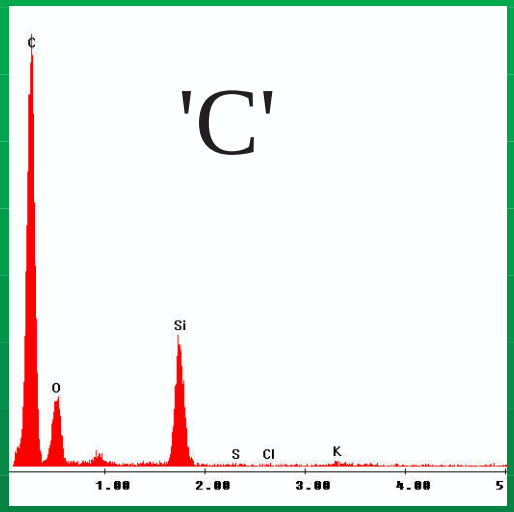
EDS

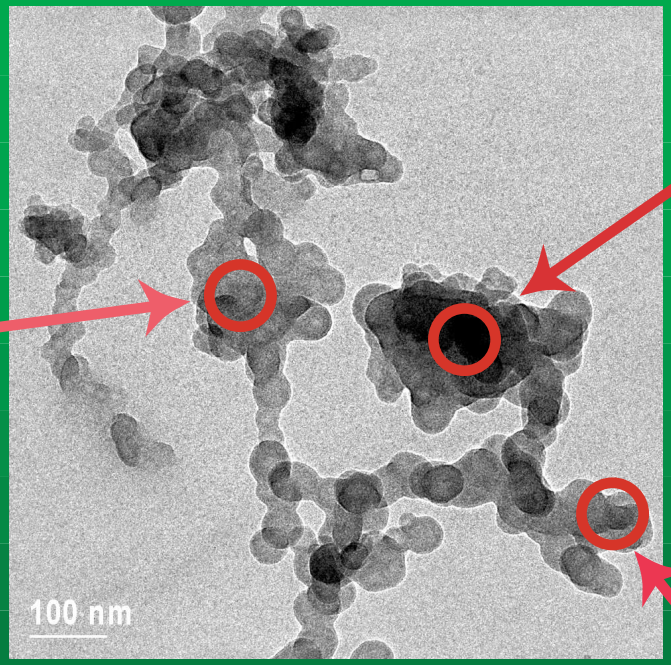
'K-Na-S-P-Ca' particles

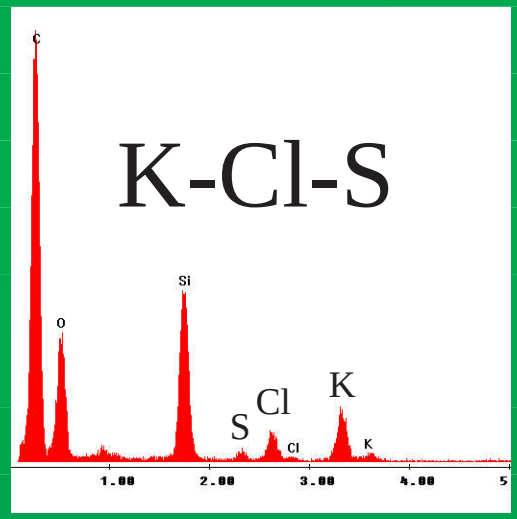
Common Soot

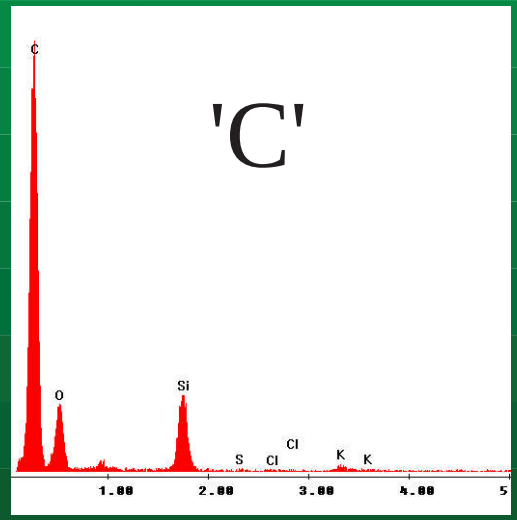


'common soot' particles









heterogeneous