

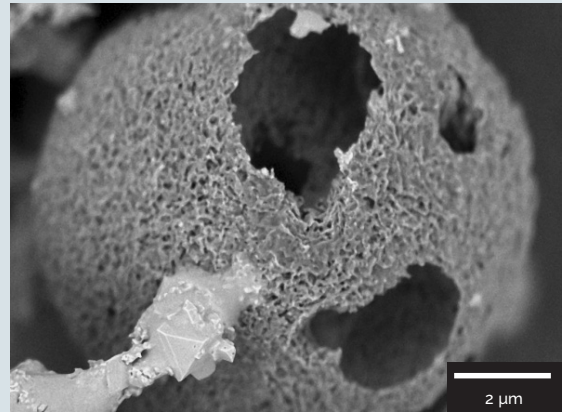


# UHR imaging of nanoparticles in fly ash

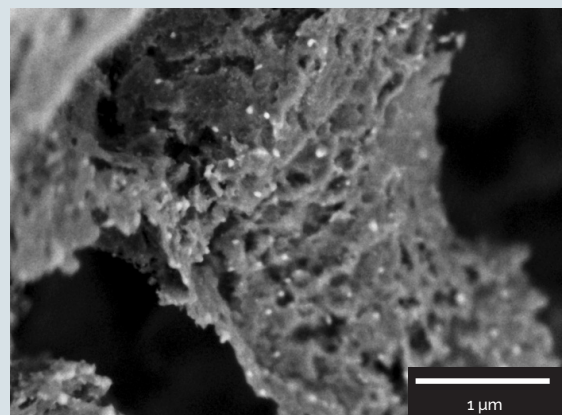
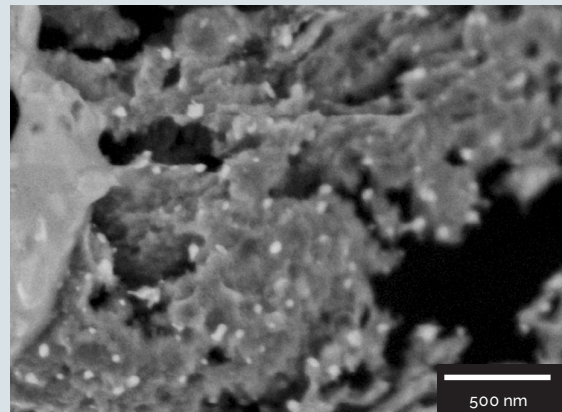
Fly ash is an industrial by-product from combustion of coal at thermal or electric generating power plants. Fly ash is also used to improve material properties in brick or in cement. The properties of the fly ash itself depend primarily on the type of coal burned. Its chemical, physical and mineralogical properties together with its availability, make fly ash very attractive for applications in materials development. In order to further exploit the use of fly ash in materials development, it is necessary to study its microstructure with scanning electron microscopy (SEM).

The TESCAN MAGNA UHR SEM with Triglav™ SEM column technology allows not only observation of entire fly ash particles but also nano-scale surface details without any sample coating. With MAGNA's TriSE™ and TriBE™ detection system, it is possible to select or combine various signals and therefore obtain information on particle composition as well as surface topography. In addition, thanks to the detection of mid-angle backscattered electrons, clusters and particles with higher atomic numbers appear brighter compared to rest of the material making it possible to visualize surface topography.

Such imaging is shown in figures 2 and 3. Heavier clusters were captured on the surface of the fly ash sample, which was not coated. Using a low acceleration voltage electron beam, we can retain surface sensitivity while reducing charging.



c Fig. 1: Fly ash imaged at 2 keV with the Mid-Angle BSE detector.



c Fig. 2+3: Detail of the fly ash surface imaged at 2 keV with the Mid-Angle BSE, shows heavier elements appear brighter.



**AXT PTY LTD**  
Authorised Distributor  
**TESCAN**  
Australia & New Zealand

1/3 Vuko Place  
Warriewood  
NSW 2102 Australia

+61 (0)2 9450 1359  
axt.com.au  
info@axt.com.au

**TESCAN ORSAY HOLDING, a.s.**

Libušina tř. 21, 623 00 Brno - Kohoutovice / Czech Republic  
(phone) +420 530 353 411 / (email) sales@tescan.com / marketing@tescan.com

