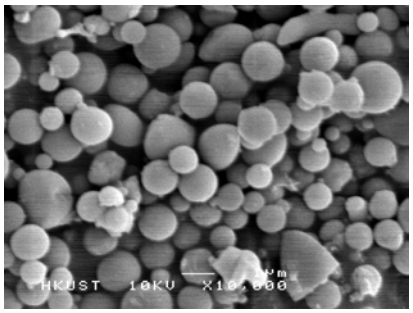
Recycling of fly ash products from coal/biomass combustion for CO_2 capture

Supervisor: Dr Philip Kwong in collaboration with local and overseas researchers
Nature of project work: Material characterization and heat/mass transfer in porous materials
Area: Nanoporous materials, carbon capture, energy
Potential implications: Development of low cost adsorbent for greenhouse mitigations from traditional thermal power stations.
Funding: *Via* the various University scholarship schemes (see separate information for these).



Brief description: Power generation from coal-fired power plants is the single largest CO_2 emission source in Australia. It accounts for about 70% of the equivalent CO_2 emissions for stationary energy combustion. It also produces large amount of fly-ash products (right) during the combustion process, most of them are taken to landfills or stored in ash lagoons. These disposal strategies not only increase the burden on landfills, but they also have secondary impacts on the surrounding habitats and ecosystems.

Efficient resource recovery from coal fly ash is major topics of current international research under the sustainability considerations. Micro-, meso-porous materials such as zeolite and molecular sieves has been found capable for adsorption based CO_2 capture. Currently, both the economic and environmental costs of large-scale production of those porous materials are considerably high due to the cost of preferred silica source and hence there is an advantage in converting coal fly ash into high quality, versatile and valuable porous materials for CO_2 capture. The study aims to investigate the different approaches in converting coal fly-ash into micro-, meso-porous materials for CO_2 capture. This project should appeal to a student with a very strong interest in chemistry and material characterizations.

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