

Taste of Research

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| Project Title: | Gas absorption testing of MgO-loaded adsorbents for applications in air purification |
| Name of Supervisor | Dr Tri Van Luong |
| Email of Supervisor | vantri.luong@unsw.edu.au |
| Name of joint/co-supervisor | Scientia Prof. Rose Amal, Timothy Zurrer |
| Email of joint/co-supervisor | r.amal@unsw.edu.au , t.zurrer@unsw.edu.au |
| School | School of Chemical Engineering |
| Faculty Research Area (Theme) | Advanced materials |
| School Research Area | Energy |
| Applicable to other Engineering schools/discipline | Chemistry |
| Abstract (300 words) | <p>Over the past few years, activated carbon, zeolite and polymer adsorbents have been developed for air purification thanks to their adsorption properties for Volatile Organic Compounds (VOCs) and other gaseous pollutants. Besides, magnesium oxide has been used as an advantageous adsorbent to remove CO₂, SO₂, etc. in air. A combination of MgO and molecular sieves, activated carbon or zeolite would enhance adsorption properties of the resultant materials for removal of CO₂, SO₂, VOCs and other harmful gases.</p> <p>The scope of the project involves an investigation of gas absorption capability of MgO-loaded adsorbents for applications in air purification. The project is developed towards the commercialisation of such advanced materials when successful.</p> |
| Research Environment | This project will be performed in the Particles and Catalysis Research Laboratory (PARTCAT) headed by Scientia Prof. Rose Amal. Apart from learning precious knowledge from Prof. Amal, the selected student will have opportunities to work directly with Tim Zurrer, a PhD candidate, who has much experience and expertise in the research area of advanced materials. Besides, the successful student will also have opportunities to visit EcoMag Ltd, which is an industry partner of UNSW, to work with the company's engineers in a pilot plant for production of magnesium compounds. |
| Novelty and Contribution | To date, air pollution has raised deep concerns to people in many nations, especially those are emerging market economies (e.g. China and Korea). In these countries, air purifiers have been employed as effective appliances playing a significant role in eliminating harmful gases and unpleasant odours to create cleaner living and working environments. The market for air filter materials |

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| | <p>integrated into air purifiers has been therefore being grown dramatically and continuously.</p> <p>The materials synthesised during this project would have various properties such as MgO contents, specific surface area and pore size that could meet product criteria required by potential customers of EcoMag Ltd when they are commercialised.</p> |
| Expected Outcomes | The project is expected to produce MgO-loaded zeolite/molecular sieves/activated carbon as the materials that could be used in manufacture industries of filters constituting air purifiers |
| Reference Material Links | N/A |
| Will the student visit the premises of an industry partner, or undertake any activity on premises external to UNSW? | Yes, he/she will |
| If yes, provide details: | The student may need to work at EcoMag Ltd for 1-2 days/week. |