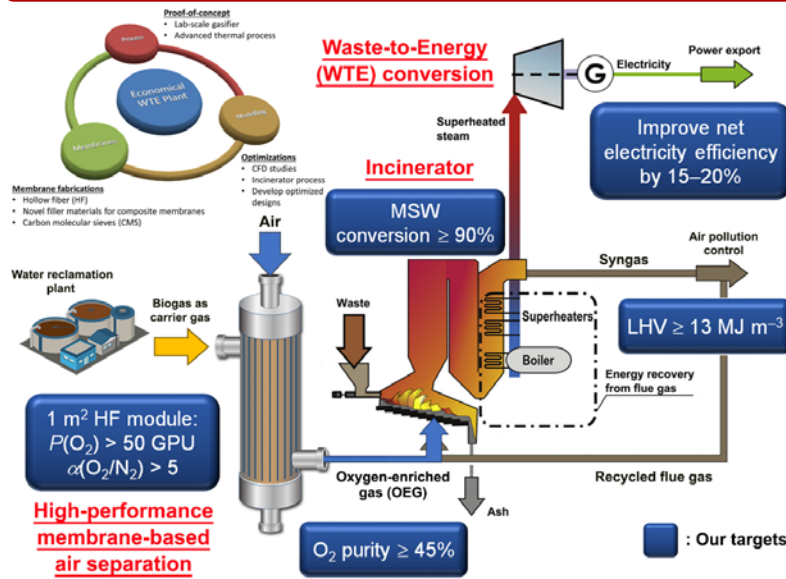


# Development and Application of High-Performance Air Separation Membranes for Oxygen-Enhanced Waste-to-Energy Incineration

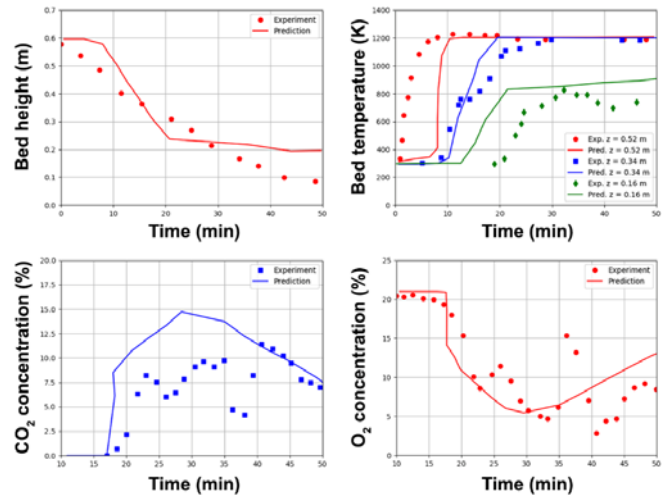
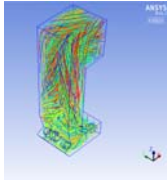
Adrian Law Wing-Keung, Rong Wang, Tae-Hyun Bae\*

## Economical Waste-to-Energy (WTE) Incineration: Our Approach



## Computational Fluid Dynamics (CFD) Modeling

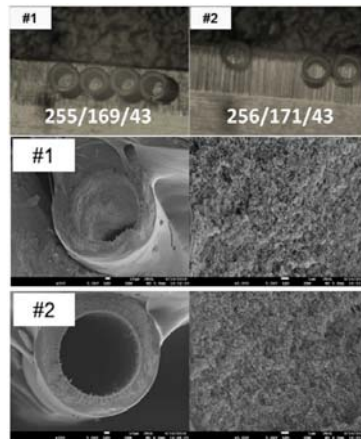
- Able to simulate the temperature distribution, mass fraction of reactants and products as well as velocity field in an incinerator
- Waste bed modelling of an incinerator gives good predictions of various parameters



## Results & Discussion

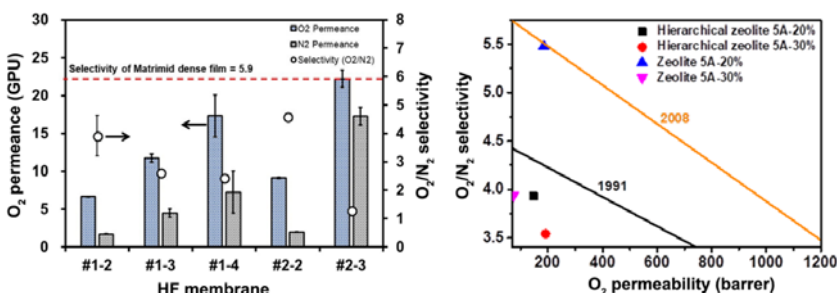
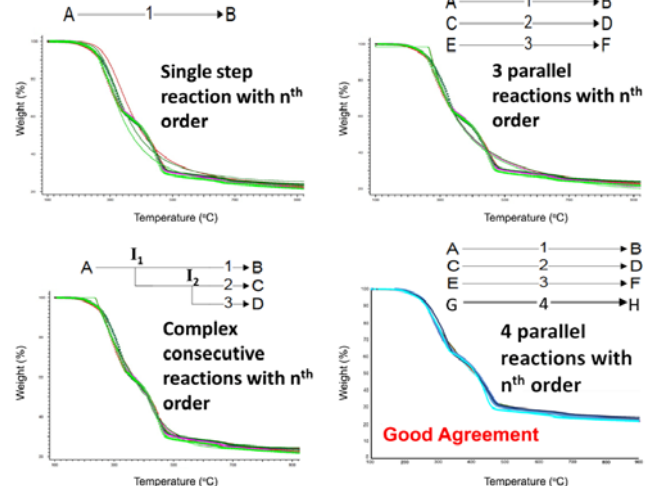
### Membranes Fabrication

- HF fabricated with commercial Matrimid® 5218 polymer
- #1 and #2 give separation approaching our target performances
- Novel fillers like MOFs, COFs, GO and zeolites were used for composite membranes
- CMS membranes with 20 wt% zeolite 5A appear promising



### Process Design

- Refuse Derived Fuel (RDF) representative of local Municipal Solid Wastes (MSW) was synthesized
- Kinetic studies carried out to understand the kinetic parameters of RDF pyrolysis



**Acknowledgement** We would like to thank the National Environment Agency of Singapore under the WTE CRP Project Ref. No. WTE CRP 1601 105