濕料源熱化學液化技術開發計畫

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- 利用堆肥廚餘、下水道有機污泥、工業有機污泥等高含水率生質廢棄物為料源，進行濕生質物高壓水熱液化技術研發及推動下水道有機污泥批次式水熱液化測試驗證。

- 複合式固體生 質燃料及其製備方法
- 燃料油精煉方法
- 脫除燃料油中硫化物的方法
- 生質油的製備方法

高壓攪拌反應模組

燃燒測試

廚餘水熱液化油

利用廚餘、有機污泥等高含水率生質廢棄物為料源，研析以水熱液化法轉化為生質燃油之技術。在高壓反應器中，於溫度290-350℃、壓力50-200bar、反應時間15~３0分鐘的條件下，將高含水率生質料源轉換為高熱值、低含氧量、低含水率之生質燃油。

- **水熱液化製程技術:**

  分析高含水率生質廢棄物之蛋白質、脂質、纖維素等組成比例，系統性建立催化劑選用、高產油率製程調控技術。廚餘、有機污泥之水熱液化油轉化率≧30%，熱值≧7,200kcal/kg，含水率<15%。

- **高壓攪拌反應模組技術:**

  水熱液化反應器之夾鉗式快速開閉蓋設計及反應器內部加熱器設計，分別可增加進料時開、閉蓋之操作便利性，以及使反應漿料溫度均勻分佈。反應器設計溫度為400℃、設計壓力為250bar、內容積12L。

Development of Thermochemical Liquefaction Technology Using Wet Bio-wastes

Execution Unit	Metal Industries Research & Development Centre
Project Director	Tzu-Chen Kuo

- To produce bio-oil via hydrothermal liquefaction technology, high moisture bio-wastes such as kitchen waste, municipal and industrial sewage sludge were used as feedstock. Moreover, batch hydrothermal liquefaction plant of municipal sewage sludge was demonstrated at the sewage treatment site.

- Composite solid Biofuel and method of preparing the same
- Method of refining fuel oil
- Method of removing sulfide from fuel oil
- Preparation of bio-oil

Stirred-tank reactor

Combustion test

Biocrude from kitchen waste

In this project, we used high moisture bio-wastes such as kitchen waste and sewage sludge as feedstock, and developed hydrothermal liquefaction (HTL) technology including design of equipment and process. Wet bio-wastes could be directly transferred into higher heating value, lower oxygen content and lower water content biocrude in a batch stirred-tank reactor via HTL technology. The biocrude was obtained at the conditions following: a reaction temperature of 290~350℃, a reaction pressure of 50~200bar and a holding time of 15~30min.

- HTL Processing Technology**:**

  The design and optimization of catalytic or non-catalytic HTL process to reach higher biocrude yield was referred to the bio-waste component ratios of protein, lipid and cellulose. The best biocrude conversion rate was more than 30%, the higher heating value was higher than 7,200kcal/kg, and the water content was less than 15%.

- Technology of Stirred-tank Reactor Design**:**

  The Stirred-tank reactor was designed with quick opening closures and an internal heater so that biomass slurry could be fed quickly and heated uniformly. Besides, the reactor with 12L capacity was designed to operate at a maximum temperature of 400℃ and a maximum pressure of 250 bar.