

## A Study on Heat Transfer Enhancement Using Straight and Twisted Internal Fin Inserts

Leonard D. Tijging<sup>†\*</sup>, Bock Choon Pak\*, Byung Joon Baek\*, Young I. Cho\*\*

직선 환과 비틀린 환의 삽입에 따른 열전달 촉진에 관한 연구

Leonard D. Tijging(전북대 원), 박복춘 · 백병준(전북대), 조영일(Drexel Univ.)

**Key Words:** Internal fins (내부핀), heat exchanger (열교환기), heat transfer enhancement (열전달 촉진), pressure drop (압력강하)

**Abstract :** The present study investigated the effect of internal aluminum fins with a star shape cross section on the heat transfer enhancement and pressure drop in a counterflow heat exchanger. A concentric tube heat exchanger was used with water as the working fluid. The heat transfer rate increased by 12-51% over the plain tube value, depending on the internal fin configuration used. However, the pressure drop also increased substantially by an average of 286-338%. The results showed that a straight fin configuration is good enough to produce a heat transfer increase in a counterflow heat exchanger. Twisted fin configurations did not further increase the heat transfer rate.

## 가스화 용융로 설계안의 열물질정산 해석

이민도\*(KAIST 원) · 최상민†(KAIST)

## Heat and Mass Balance Analysis for Design of Gasification Melting Furnaces

Mindo Lee, Sangmin Choi

**Key Words:** Gasification Melting (가스화 용융), Heat and Mass Balance(열물질정산)

**Abstract:** Recently, social interest about low pollution waste treatment process is growing. As an alternative to the conventional mass-burn incinerator, new technology concept, gasification melting method that can replace the existing incineration method and necessity of engineering analysis for a gasification melting furnace is risen. In this study, pyrolysis gas composition and rate in equilibrium state of the process and gasification/melting devices are reviewed. Heat and mass balance analysis for the gasification melting furnaces is conducted. By comparing waste input and capacity of the respective furnace, sizing for gasification melting furnace is evaluated. The comparability of the capacity-sizing relation is checked against the stoker type incinerator, fluidized bed type incinerator, and the blast furnace. Design standards for gasification melting furnaces are discussed.