

Abstract:

This paper presents new design of pyro-processing unit in a cement factory. In this case decomposition reactions have been separated from other reactions which result in pure carbon dioxide production. Decomposition reactions take place in calciner without fuel consumption by utilizing a hot CO₂ stream as heat carrier and exhaust gases have been employed to produce steam and power. As result of such novelties new process can significantly reduce 66% of CO₂ emission and 2.3% of energy consumption compared to the existing process. Moreover proposed design demonstrated remarkable environmental advantages against some relevant studies and processes. As far as process economy is concerned, novel design can annually achieve 20.7 million USD gross incomes compared to the base case.