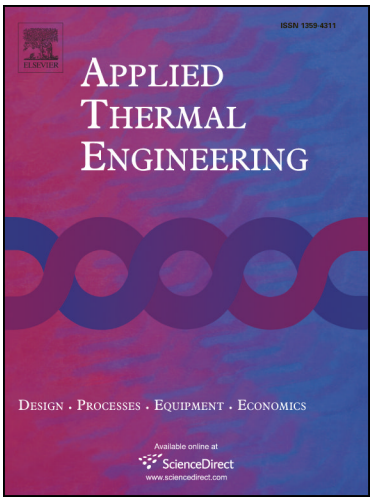

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C.R. Hiremath, Ravikiran Kadoli, V.V. Katti

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EXPERIMENTAL AND THEORETICAL STUDY ON DEHUMIDIFICATION POTENTIAL OF CLAY - ADDITIVES BASED $CaCl_2$ COMPOSITE DESICCANTS

C. R. Hiremath[1]., Ravikiran Kadoli[1]., V. V. Katti[2].

[1]Dept of Mechanical Engineering, National Institute of Technology Karnataka Srinivasnagar-575025, Mangalore, India.

[2] Vishwanathrao Deshpande Rural Institute of Technology, Haliyal, Karnataka, India.

[Email:[1]corresponding author chandra.hiremath@yahoo.com,:rkkadoli@nitk.ac.in,:katti.vadiraj@gmail.com]

ABSTRACT

Transported clay suitable for pot making is used as desiccant carrier. Additives like saw dust and horse dung are considered in particle preparation. Particles nearly spherical in shape are prepared manually and are dried under shadow and subsequently the particles are dried at different temperatures. These burnt particles are characterized for pore volume and surface area. The BET test reveals that clay particles subjected to 500°C possess higher pore volume but clay-horse dung particles exhibit higher surface area. Heat treated particles of clay with additives are impregnated with $CaCl_2$ solution of 50% concentration. The ratio of desiccant water content to surrounding layer water content varies from 14.09 to 75.34 for $CaCl_2$ based composite desiccants. One dimensional PGC mass transfer model is adopted from species conservation in gas and solid phase. The RMSE of measured and predicted results of the present theoretical model are in the range of 3.26% to 13.2%.

Keywords: Burnt clay, Additives, $CaCl_2$, Composite desiccant, PGC.

NOMENCLATURE:

a	specific surface area, m^{-1}
A_{sf}	total interfacial area available for heat and mass transfer, m^2
A	cross sectional area of bed , m^2
$c_{1e,in}$	inlet air specific humidity, g/kg of moist air
$c_{1e,out}$	exit air specific humidity, g/kg of moist air