

소성 Dolomite 수화물계 화학열펌프의 고체 반응층 전열해석

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This study was carried out to investigate the heat-storage/-release characteristics of the thermochemical reaction of the calcined Dolomite and steam system for the application of chemical heat pump with the packed bed shape experimental apparatus.

Our results from the studies are as follows ;

MgO of the calcined dolomite can be regard as an inert material. Because the reaction was proceeded from the packed bed input to packed bed output and from wall to center, it could be thought that the rate determining step is not the reaction itself but the heat transfer. It was found that all of calcined Dolomite packed bed kept the reaction temperature of about 750K throughout the entire part of the bed, immediately after the steam was introduced exothermic reaction of hydration was proceeded from the packed bed input to packed bed output and from wall side to center. Two dimensional (radial and circumferential) partial differential equations, concerning heat and mass transfer rate in the packed bed of calcined Dolomite, are solved numerically to describe the characteristics of the reaction in the cylindrical reactor. The solution reads rate of reaction in the packed bed reactor depends on the temperature and concentration of reactants.