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A Study of Thermal Insulation Properties of Rigid Open-cell Polyurethane Vacuum Insulation Panel System

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ABSTRACT

The open cell rigid polyurethane (PU) foam for vacuum insulation panel (VIP) which contain non-CFCs or non-HCFCs and with high thermal resistance have been studied in this research. The objective was to identify factors which influence the batch manufacture efficiency and the thermal conductivity performance of the PU vacuum insulation panels.

The thermal conductivity performances of vacuum insulation panels were experimentally investigated. The change of thermal conductivity of PU VIPs are as functions of drying pretreatment temperature and time, PU foam cell size, the encapsulation barrier, getter, evacuation pressure.

The VIPs have a low thermal conductivity (7.1 mW/mK), under the 120°C, 10 minutes pretreatment, 14 mTorr evacuation pressure, the composition of CPP/Al/PET laminated film bag and with zeolite and active carbon mixture getters, which insulation effectiveness is four times better than those former CFCs blowing rigid PU foam.

Key words: PU, CFCs, Vacuum insulation panel(VIP), Thermal conductivity

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