Thermal and mechanical properties of rigid polyurethane foams blown by environmentally-friendly blowing agent

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The blowing agent is an important component that influence on the environmental and thermal properties of rigid polyurethane foams (PUF). The blowing agent hydrofluorocarbon (HFC) which has a high global warming potential (GWP) is the environmental regulatory material by Montreal protocol. Therefore this presentation addresses the use of envriomentally-friendly blowing agent (HFO-12333zd). Then we focused on the improvement of thermal and mechanical behavior of PUF by adding the nucleation agent such as methoxynonafluorobutane. When replacing the HFC-245fa to HFO-1233zd, the improvement of thermal insulating properties of PUF can be achieved by reducing the cell size of the PUF. Under the same density of polyurethane foams, cell size decreased with increasing the methoxynonafluorobutane content. In this study, thermal, morphological, and mechanical properties of the PUF were obtained by the use of thermal conductivity analyzer, scanning electron microscopy (SEM), and universal testing machine (UTM), respectively.