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The role of microstructure on the mechanical properties of polyurethane foams containing thermoregulating microcapsules

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1 **THE ROLE OF MICROSTRUCTURE ON THE MECHANICAL PROPERTIES**
2 **OF POLYURETHANE FOAMS CONTAINING THERMOREGULATING**
3 **MICROCAPSULES.**

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14 **Abstract**

15 Rigid polyurethane foams with up to 50wt% of microcapsules from LDPE-EVA
16 containing Rubitherm®RT27 were synthesized. The influence of microcapsules on the
17 foams density, microstructure and mechanical resistance was studied. Cell size and
18 strut and wall thicknesses were analyzed by SEM. The relationships between densities
19 and foam microstructures with their Young's moduli and collapse stress were found by
20 the Gibson and Ashby formulations and the Kerner equation for mechanical properties
21 of composites. It was found a cell structure change from polyhedral closed-cells to
22 spherical or amorphous open-cells. A good agreement between the experimental and
23 theoretical data was observed but requiring a cell form factor. Thus, Fitting parameters
24 confirmed the high trend of these microcapsules to be incorporated into the foam cell

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