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A novel optimized mold release Oil-in-Water emulsion for polyurethane foams production

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Abstract

Release agents are compounds usually sprayed on the molds surface, forming a thin film that can act as a barrier preventing the sticking. Herein, both physical and chemical optimization of a wax-based O/W emulsion for polyurethane (PU) foams is reported. E_NN_{1.8}Cet_{1.2}Ac_{2.5} sample (where N, Cet and Ac stand for the percentages of linear amine, cetyl alcohol and acetic acid), emulsified by the inversion point method, turned out to have the optimal composition, in terms of smaller oil droplets size (by Dynamic Light Scattering analysis and optical measurements), long-term stability (by Abbe refractometer and backscattering tests), good spreading (contact angle and surface tension measurements) and low corrosion phenomena (by potentiodynamic polarization tests, Scanning Electron Microscopy analysis). Principal Component Analysis helped to find the best correlations among all the investigated variables and to have some predictions on the role of the different raw materials in affecting the final stability of the emulsions.

Keywords

O/W emulsion; mold releasing; interfaces; emulsion stability; chemometrics; corrosion.

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