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Life Cycle Analysis applied to acrylic acid production process with different fuels for steam generation

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Abstract

Acrylic acid, one of the most important monomers, has a wide range of uses e.g. in the paints adhesives, textile finishing, leather processing or super absorbents. The production process from propylene is well known and used at industrial scale in the USA, Europe, and Asia. The present paper focuses on the evaluation of the environmental impact of the acrylic acid production process from propylene. Steam is a major raw material in the process under study, consequently different paths to obtain steam are investigated. The process was simulated using commercial software (Aspen Plus, PROII). A productivity capacity of 50000 tones/year of acrylic acid has been considered. The environmental assessment, evaluated using life cycle analysis method, depends on the material and energy balances generated by simulations. The present work uses a cradle-to-grave approach. The functional unit, to which all the environmental results for the cases under study are reported, is one tone of acrylic acid produced. The boundaries of the system cover: i) acrylic acid production; ii) upstream processes for example catalyst and molten salt production; steam production using various

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