

## **HYDROXY ETHYL SULFONE BASED REACTIVE COALESCING AGENTS FOR WATER BORNE COATING WITH LOW ENVIRONMENTAL IMPACT**

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One of the successful industrial approaches for making surface coatings with low environmental impact is adopting waterborne formulations. In general, emissions from the waterborne coatings are significantly less in comparison to solvent based coatings. However, present waterborne coatings still use substantial amount of small organic compounds (SOCs) as functional additives for various purposes. Coalescing agent (CA) is one among them and helps to reduce the glass transition temperature ( $T_g$ ) of the binder polymer. However, these CAs are vulnerable to vaporize into the environment (volatile organic compounds, VOCs) and causes environmental pollution and long term health hazards. One of the novel strategies to avoid this issue is to use reactive coalescing agents (RCAs) that and become integral part of the coating during drying process. Facile dehydration of  $\beta$ -hydroxy sulfones present in HES known to form vinyl sulfone, which subsequently reacts with other nucleophilic groups present in other entity. In the present work, we have exploited a similar concept in the development of a series of novel hydroxyl ethyl sulfone (HES) based RCAs. Coalescing performance of HESs were investigated by measuring minimum film formation temperature (MFFT). We found that HES compounds react with alcohol and amine monomers as well as crosslink with polymers during drying process. Preliminary experimental studies indicated that HES undergo 'water-release-triggered equilibrium' reactions through the formation of corresponding vinyl sulfone (VS). The VS intermediate was isolated and characterized for the first time. The details on the HES and VS equilibrium and reactivity of HES with alcohol and amine containing polymers will be presented.