

## **SYNTHESIS AND CHARACTERIZATION OF NEW BINDERS FOR EMULSION COATING APPLICATION CONTAINING IN WATER BASED METH ACRYLIC HYBRID RESINS**

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### **ABSTRACT**

*Binder is an important ingredient in pigment coating as it is used to impart adhesion, gloss and flexibility to the dried film as well as binding the pigment particles together. Series of emulsion methacrylic copolymers having different composition ratios of methyl acrylic acid(MAA) with butylacrylate(BuA), methyl methacrylate (MMA), styrene, polyvinyl alcohol (P.V.A) were prepared and characterized. The preparation was carried out in industrial scale in batch reactor at pH 7, using potassium persulphate(KPS) and Sodium metabisulfate ( $Na_2S_2O_5$ ) as an initiator, Dodecyl Benzene Sulphonic acid SDBA as an emulsifier, and sodium dodecylsulfonic acid SDBAS as co-emulsifier in presence of tri methylchlorosilane(TMCS) at 70°C for 4 hours. The chemical structures of the prepared binders were characterized by FTIR and <sup>1</sup>HNMR spectra. The various physic-chemical properties of emulsion methacrylic copolymers including density, viscosity, chemical resistance and volatile matter were studied. The results show that emulsion acrylic copolymers are readily soluble in aprotic polar solvents such as (Toluene, Acetone, Benzene, xylene, DMF, DMSO, Methanol, and ethanol) without being in need of heating. The obtained emulsion copolymers had high solid content and were used in emulsion paints as a binder. The experimental results show that these polymers supply very useful properties such as high anticorrosive. The binder film is evaluated by measuring their chemical resistance. Thermal analysis of emulsion copolymers is conducted by using thermo Gravimetric analysis (TGA) and Thermal differential calorimeter (DSC) techniques, which reveals that the emulsion acrylic polymers possess thermal stability.*

**KEYWORDS:** *Binder, Coating, Emulsion Polymerization, Methacrylic acid, Surfactants*

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### **Article History**

**Received: 24 Feb 2018 | Revised: 06 Mar 2018 | Accepted: 16 Mar 2018**

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### **INTRODUCTION**

Acrylic resins, which have an important commercial application in the paint industry, are prepared through the polymerization of acrylic and methacrylic acids or their corresponding esters. The key attributes of acrylic coatings are their resistance to hydrolysis during extended exterior exposure (weathering), high block resistance, hardness, gloss, and high alkali and oxidation resistance [1]. Coating mixture consists primarily of pigments dispersed in water, plus binders, co-binders and other additives [2-4]. Binder is added to the coating to bind pigment particles to each other and to fill voids between pigment particles so that the coating layer will not be removed during the operation [5]. Binders are desired to meet various requirements such as good binding power, mixed and dissolved easily in water, good chemical and