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Aim of the work

The new trend in the paint industry is the production of friendly environmental paints. The proposed work goes hand in hand with this direction. The aim of this work is to produce anti-corrosive paints free of anti-corrosive pigments which are added by the amounts 25-30 % of the total mass of paint. These anti-corrosive pigments are expensive and most of them contain essentially heavy metals e.g. Pb, Cr, Ba ...etc.

The paints which will be prepared in this work, will contain heterocyclic adducts which result from the reaction of 2-mercapto- Δ^2 -thiazoline (2-MT), 2-mercaptobenzothiazole (2-MBT), 2-mercapto-5-methyl-1, 3, 4-thiadiazole (2-MMT), and 3-mercapto-4-methyl-4H-1, 2, 4-triazole (3-MMT), with epoxidized soybean oil instead of toxic anti-corrosive pigments. These adducts will be added in less than 0.5 % of the total mass of paint. Also, it is very interesting to minimize the amount of solvents in the paints, or to get rid of them.

The prepared adducts may adsorbed at the metal surface forming a very thin layer film through the lone pair of electrons of the sulfur atom, which may act as corrosion inhibitors. Furthermore, the hydrophilic part of the oil may repel water molecules preventing them to penetrate to the metal surface.

Abstract

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This work has been carried out to investigate the following:

- Preparation and characterization of some sulfur adducts.
- Emulsification of the prepared sulfur adducts using suitable surfactants.
- Incorporation of the emulsified adducts into different emulsion paint formulations to evaluate them as corrosion inhibitors.
- Studying the corrosion inhibition efficiency of the prepared sulfur adducts as corrosion inhibitors for mild steel.
- Making a comparative study between the prepared anti-corrosive emulsion paint formulations, and those containing some of the most traditionally used anti-corrosive pigments.
- Determination of the physical, chemical and mechanical properties of paint films of all above steps.

Key Words: Thiazole; Thiazoline; Thiadiazole; Triazole; Corrosion inhibitors; Surfactant; Emulsification; Water-borne paints; Mild steel.

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