Gypsum scale formation on heated metal surfaces: The influence of polymer type and polymer stability on gypsum inhibition

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ABSTRACT

The deposition of gypsum (i.e. calcium sulfate dihydrate) on brass heat exchanger surfaces in the presence of homopolymers and copolymers containing different functional groups from aqueous solution has been studied. The amount of gypsum deposited on the heat exchanger surface (in the absence of bulk or spontaneous precipitation) is strongly dependent on the polymer architecture and the polymer concentration. Scanning electron microscopic investigations on the deposit show morphological changes to the crystals due to interactive effects of some of the polymers. The effectiveness of the polymers as inhibitors was reduced by thermal treatment (150–240°C), likely due to polymer degradation.

Keywords: Gypsum; Heat exchanger; Polymers; Heat treatment; Crystal morphology