Synthesis of polyaspartic acid/2-amino-2-methyl-1,3-propanediol graft copolymer and evaluation of its scale inhibition and corrosion inhibition performance

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ABSTRACT

Polyaspartic acid/2-amino-2-methyl-1,3-propanediol graft copolymer, a novel non-phosphorus scale and corrosion inhibitor, was synthesized and characterized by infrared spectroscopy. Its performance was evaluated by static scale inhibition method and dynamic corrosion testing. It was found that the graft copolymer showed excellent inhibition ability against CaCO3, CaSO4, and Ca3(PO4)2 scales and a definite inhibition corrosion performance as well. The inhibition efficiency was close to 99.9% against CaCO3, CaSO4, and Ca3(PO4)2 when the inhibitor was at an appropriate concentration. The inhibitor had still possessed higher antiscale efficiency against CaCO3 with increasing concentration of Ca2+ and heating time. In addition, The graft copolymer could change the structure of crystals CaCO3, CaSO4, and Ca3(PO4)2 by observation of scanning electron microscopy.

Keywords: Polyaspartic acid/2-amino-2-methyl-1,3-propanediol; Scale inhibition; Corrosion inhibition