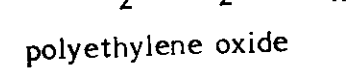
CHAPTER 1

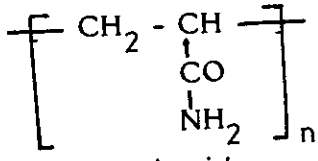
INTRODUCTION

Polyelectrolytes are water-soluble polymers with many adsorption sites which are available for adsorption on the colloid particles. One polymer molecule can therefore become adsorbed on to several colloid particles thus forming a bridge between particles and producing a stable floc. Such polymers may be anionic (negatively charged) or cationic (positively charged) or even nonionic. Some examples of the types of molecules that are suitable are [1]:

Nonionic

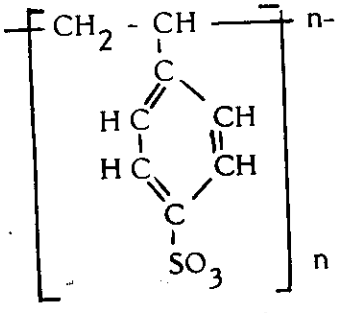


polyethylene oxide

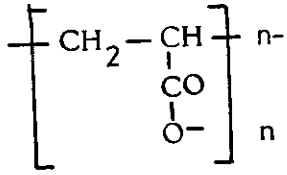


polyacrylamide.

Anionic

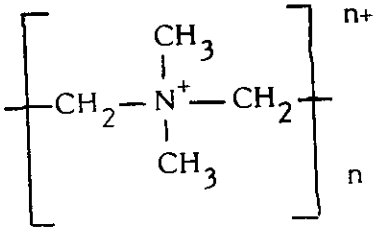


polystyrene sulphonate

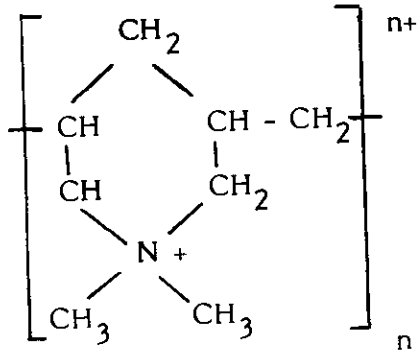


polyacrylic acid

Cationic



Quaternary polyamide



polydiallyldimethylammonium

Other compounds have been cited in literature [2-7]. These compounds are natural or synthetic and have an important role to play in the treatment of water and wastewater. They are being sold by many companies and are used extensively for different purposes to control solids in potable water, municpal wastewaters and different industrial wastewaters, in chapter (2) of this work a comperhensive review on the different uses of polyelectrolytes will be given.

The aim of the undertaken work is to prepare and characterize some polyalkylarylamines and investigating its behaviour as a flocculant aid in water treatment. The different methods for synthesis of alkylarylamines include the reaction of aromatic amines with alcohols at a pressure of 80 bar and temperature of 280°C [8]. Other methods require the reaction of alkyl chlorides with aromatic amines in the presence of catalysts: lithium amide [9], complex of lithium with naphthalene [10] and ion exchange resin [11]. Also, 2-substituted benzimidazoles or imidazoles have reacted with alkyl iodide in the presence of KOH [12].

Recently Studnicky [13-17] concluded that the chloroalkylarylamines were prepared by the reaction of polychloroalkanes with aromatic amines in the presence of catalytic amounts of stannous chloride and hydrochloric acid in methanol as solvent at 50 - 60°C .

$$ArNH_2 + Cl - R - Cl + SnCl_2 + H^+ \overset{K}{\rightleftharpoons} [Ar\overset{+}{N}H_2 HRCl\,][\,SnCl_3^-\,]$$

$$\xrightarrow{K_p} \quad Ar\,NH_2\,RCl + SnCl_2 + HCl$$

The adduct of chloroalkylarylamine with stannous chloride is an intermediate product. Further, these adducts have reacted with ammonium carbonate and have given polyamine hydrochlorides. Polyamine hydrochlorides were neutralized with Na OH to give the free polymers.

Some of the prepared and characterized polyalkylarylamines have been tested as a coagulant aid either alone or in combination with alum. They were put in comparison with polyacrylamide.