PREFACE

Due to rapid progress in the modern technology, metallic materials are finding their way in the construction of machineries, storage equipment, structures and manufactured articles in an increasing volume. Preservation and protection of this enormous stock of metals from deterioration by corrosion is, therefore, one of the burning problems of our time. In recent years corrosion control has become a science. Advanced theories based on the subjects like electrochemistry, surface chemistry, physical metallurgy etc. are required for better understanding of the complex corrosion processes. The basis of the electrochemical mechanism of the destruction of metals by corrosion in corrosive media possessing ionic conductance and the relationship between the rates of electrochemical corrosion processes with the kinetics of electrode processes and their study with different electrochemical techniques are vital in the study of the effective ways of control of 'corrosion processes' in a given medium for a particular metal.

When various methods of protecting metals, such as plating or lacquering, are either ineffective or, as in the case of precision measuring instruments and apparatus, inapplicable, corrosion inhibitors can sometimes

be employed to advantage. Control of corrosion process by organic inhibitors is, therefore, attracting increasing attention of the workers in the different fields of science and technology.

Much interest has been created in recent years by the application to corrosion of ideas derived from the study of the dropping mercury electrode and the capillary electrometer. In electrocapillary phenomena, particularly from the point of view of corrosion inhibition, competitive adsorption is of importance. Antropov's hypotheses concerning 'phi-scale of potentials', which is a scale of electrode charge, whereby it is possible to predict the potential range in which anionic or cationic inhibitors should be adsorbed preferentially from acid electrolytes, are of great theoretical importance, showing a possibility for electrocapillary data to be used for the study of inhibitors' action.

The thesis aims at discussing the major findings made during recent years on the above aspects in the field of corrosion inhibition for ferrous metals in aqueous acidic solutions. The utility of the 'phi-scale of potentials' (also known as 'correlative or reduced scale of potentials') as applied to the study of adsorption of organic inhibitors on metals at a metal/solution interface, thereby inhibiting the corrosion process, has been

critically discussed and its limitations brought out in the light of the results obtained from the present investigation on corrosion inhibition of mild steel in sulphuric acid medium by specific inhibitors belonging to different classes.

Attempts have been made to systematise the available information on the subject through references to published work.