ABSTRACT.

The thesis embodies the results of the investigations carried out on the hornblende-plagioclase and calc-silicate gneisses and associated pegmatites in migmatitic terrains of Gumla and Sibsagar of Bihar from a petrochemical point of view.

Lithological mapping and petrological studies of the various rock types have been made.

Genesis of myrmekites in the hornblende plagioclase gneisses and in the associated pegmatites has been attributed to a set of chemical reactions which took place during the process of metasomatism.

It has been felt that the existing methods of petrochemical calculations for rocks undergoing metasomatism cannot satisfactorily explain the elemental migration. A new method for the petrochemical calculations in metasomatic processes has been given and it has been shown that it is more preferable to the existing methods. This method is simple, quick and avoids confusion.

The most important contribution from the present work is to develop a new concept of metamorphic facies on

the basis of chemical reactions.

The reactions that have taken place in hornblende-plagioclase and calc-silicate gneiss samples collected from the borders of pegmatites have been deciphered. Chemical analyses of these rocks have been made and these have been plotted on the A - C - F - K four component diagrams. Correlation of the mineral assemblages belonging to different facies with the chemical reactions has been made in the light of the position of such plots in the A - C - F - K diagram.

Some minor elements in selected rocks have been estimated from which an attempt has been made to show the genetic relationship of the rocks under study.