CHAPTER IV

SUMMARY
In the present investigation the following units of work have been accomplished.

1. *cis*-1-***p***-Chlorophenylthiostilbene has been prepared from diphenylacetylene.

2. *cis*- And *trans*-1-bromo-1-***p***-chlorophenylthiostilbenes are prepared by the bromination of *cis*-1-***p***-chlorophenylthiostilbene.

3. The *trans*-1-bromo-2-***p***-chlorophenylthiostilbene is also prepared by the stereospecific synthesis, by addition of *p*-chlorophenylsulphenyl bromide to diphenylacetylene.

4. The *cis*- and *trans*-1-bromo-2-***p***-chlorophenylthiostilbenes are oxidised to the corresponding *cis*- and *trans*-1-bromo-2-***p***-chlorophenylsulphonyl-stilbenes.

5. The *cis*-1-bromo-2-***p***-chlorophenylsulphonylstilbene on condensation with sodium salts of various aromatic thiols resulted in the formation of *cis*-1-arylothio-2-***p***-chlorophenylsulphonylstilbenes with retention of configuration.

6. The various *cis*-1-arylothio-2-***p***-chlorophenylsulphonylstilbenes have been oxidised to the corresponding *cis*-1-arylsulphonyl-2-***p***-chlorophenylsulphonylstitbenes.

7. The *trans*-1-bromo-2-***p***-chlorophenylsulphonylstilbene on condensation with sodium salts of various aromatic thiols gave the *trans*-1-arylothio-2-***p***-chlorophenylsulphonylstilbenes.
8. The trans-1-aryltio-2-<i>p</i>-chlorophenylsulphonylstilbenes have been oxidised to the corresponding trans-1-arylsulphonyl-2-<i>p</i>-chlorophenylsulphonylstilbenes.

9. The ultraviolet absorption spectra of all the new compounds prepared in the present investigation have been recorded and analysed. All the cis-sulphide-sulphones exhibit a conjugation band around 300 to 305 nm region and the trans-sulphide-sulphones around 289 to 294 nm region. A second and third band occurs in the spectra of all the cis- and trans-sulphide-sulphones around 232 to 238 nm region and 207 to 209 nm region respectively.

The conjugation band of cis-isomers occurs at a slightly longer wavelength than the corresponding trans-isomers. A similar shift in the λ<sub>max</sub> for the cis- and trans-isomers of α,α'-dialkylstilbenes and sulphide-sulphones have been observed. The conjugation band of trans-isomers is more intense that the corresponding cis-isomers. The lowering extinction coefficient for the cis-isomers in comparison to trans-isomers is attributed to the steric inhibition of resonance in the cis-isomers.

All the cis- and trans-disulphones showed a long wavelength band around 243 to 247 nm region, a second band around 226 to 228 nm region and a third band around 206 to 208 nm region. The long wavelength band present in sulphide-sulphones around 300 nm region is completely absent in disulphones. This is attributed to the steric interferences of the bulky
sulphone groups which prevents the molecule from attaining a planar configuration.

The trans-disulphones show slightly higher molecular extinction coefficients than the corresponding cis-isomers and the $\lambda_{\text{max}}$ of the cis- and trans-disulphones and almost same.

10. The infrared absorption spectra of all the cis- and trans-sulphide-sulphones and disulphones have been recorded. A weak C=C stretching frequency band is observed for the cis-sulphide-sulphones and cis-disulphones between 1620 and 1647 cm$^{-1}$ and for trans-sulphide-sulphones and trans-disulphones between 1650 and 1660 cm$^{-1}$.

All the cis- and trans-sulphide-sulphones and disulphones exhibited strong asymmetric stretching vibrations of sulphone groups at 1306-1339 cm$^{-1}$ and symmetric stretching vibrations at 1142-1156 cm$^{-1}$. No characteristic differences are observed in the position of these bands in both cis- and trans-sulphide-sulphones and disulphones. All the cis- and trans-sulphide-sulphones and disulphones exhibited a characteristic band at 1085-1087 cm$^{-1}$ which is characteristic of Ar-S group.

The new compounds prepared during the present investigation were:

- cis-1-Benzylthio-2-\textit{p}-chlorophenylsulphonylstilbene, m.p 161-162° C.
- trans-1-Benzylthio-2-\textit{p}-chlorophenylsulphonylstilbene, m.p 166-167° C.
- cis-1-Benzylsulphonyl-2-\textit{p}-chlorophenylsulphonylstilbene, m.p 190-91° C.
trans-1-Benzylsulphonyl-2-p-chlorophenylsulphonylstilbene, m.p. 210-211°C.

cis-1-p-Fluorophenylthio-2-p-chlorophenylsulphonylstilbene, m.p. 177-178°C.

trans-1-p-Fluorophenylthio-2-p-chlorophenylsulphonylstilbene, m.p. 190-191°C.

cis-1-p-Fluorophenylsulphonyl-2-p-chlorophenylsulphonylstilbene, m.p. 216-217°C.

trans-1-p-Fluorophenylsulphonyl-2-p-chlorophenylsulphonylstilbene, m.p. 272-273°C.

cis-1-p-Methoxyphenylthio-2-p-chlorophenylsulphonylstilbene, m.p. 155-156°C.

trans-1-p-Methoxyphenylthio-2-p-chlorophenylsulphonylstilbene, m.p. 155-156°C.

cis-1-p-Methoxyphenylsulphonyl-2-p-chlorophenylsulphonylstilbene, m.p. 210-251°C.

trans-1-p-Methoxyphenylsulphonyl-2-p-chlorophenylsulphonylstilbene, m.p. 230-231°C.