In this Thesis, the structure of thin films formed by a conducting polymer, polyaniline, was studied using mainly infrared and Raman spectroscopies. That led to the study of aniline oligomers. The oligomers play a key role in the formation of thin films and nanostructures of polyaniline. Furthermore, the Thesis deals with the carbonization of various forms of polyaniline (granular polyaniline base, thin films of polyaniline salt, multi-wall carbon nanotubes coated with polyaniline salt or base, polyaniline nanotubes/nanorods prepared in the presence of ethanol). The two topics, aniline oligomers and carbonization of polyaniline, are connected by a paper concerning the carbonization of microspheres formed during oxidation of aniline in alkaline medium. Optical microscopy, transmission and scanning electron microscopy, UV–Vis spectroscopy, spectroscopic ellipsometry, wide angle X-ray scattering and thermogravimetric analysis were used.