Preface

Mankind’s desire is to replicate the nature’s creation provided an impetus and inspiration to the rapid advancements, especially progress made in the sensors and other devices for next generation technologies from nanoscience and engineering. Generally, human being has five basic sensory organs, which helps to perform routine tasks in normal life. This clearly signify the importance of basic sensory organs in a human life. In a similar way, sensors and other devices are very important for most of the scientific and engineering applications. The aim of the present thesis work is to explore the application possibilities of graphene and its derivative based films deposited on a flexible substrate for the development of sensors and other devices. Different types of flexible/rigid substrates such as Kapton, Cotton Cloth and Stainless Steel were chosen for different applications. Drop casting and Dip coating techniques were adopted for the deposition of graphene and its derivative based films onto the above-mentioned substrates. The necessary process parameters were optimized to achieve good quality films. To explore the applications in sensors and other devices have been developed by utilizing the direct transformation of graphene and its derivative nanomaterial-based films deposited on flexible/rigid substrates by above mentioned techniques. These devices include temperature sensor for measurement of environmental parameters, heating element devices on cotton cloth for wearable body warmer (in cold places). On the other hand, using piezoresistive effect of graphene and its derivative nanomaterial film strain gauges for force sensor have also been developed. This includes, a film nanomaterial of graphene and its derivatives was used for tensile test of force sensor/device, which work as a load cell. The present thesis work is divided into the following six chapters.