CHAPTER I
INTRODUCTION

Carbon foam which is a porous and sponge-like carbon material has recently attracted great attention because of their light weight and potential tailorability of their physical properties. The applications of carbon foams include thermal management, electrodes, catalyst supports and filters, owing to their novel features, such as adjustable thermal conductivity and electrical conductivity, high porosity, microwave absorption, supercapacitors, low thermal expansion coefficient, high-temperature tolerance, etc.

Carbon foam has been successfully produced by using different types of precursors including thermosetting polymers, coal, polyimides, olive stones, pitches, etc. Benzoxazines can be thermally activated and do not require acid or base catalysts for ring-opening polymerization. The unique chemistry provides tremendous opportunities for molecular design and offers a number of inherent processing benefit including low melt viscosity, no volatile release upon curing, rapid property development, and low overall shrinkage. Benzoxazine monomers are readily synthesized, either in solution or by a patented melt-state process through the Mannich condensation of a phenolic derivative, formaldehyde, and amine. In this study, carbon foam was made from polybenzoxazine which is a novel class of phenolic resins that possesses high crosslinking density. Additionally, polybenzoxazine has high aromatic content with strong chemical bonds resulting in high mechanical and thermal stability properties. Carbon foam can be easily prepared by using benzoxazine as a precursor and azodicarbonamide (AZD) as a blowing agent.