CHAPTER I
INTRODUCTION

Nowadays, due to human activity, the disposal of solid residues is a growing problem in our modern society, which is causing many environmental troubles. In the UK alone, scrap tires pile up annually about half a million tones (The review, The university of Leads Magazine, 2000). In the US each year, an estimated 270 million tires reach their end of life, over a billion throughout the world (Marketplace). The complex nature of tires makes difficulties on recycling. On one hand, the main component of tires, rubber, is a chemically cross-linked polymer and, therefore it cannot be either fused or soluble and, be remoulded into other shapes without severe degradation. On the other hand, tires are a complex mixture of very different materials, which include several rubbers, carbon blacks, steel cord, and other organic and inorganic minor compounds.

The most common way of disposal of waste tires is dumpling them into landfill site, but the physical properties of tires give rise to problems. Tires have high resistance to biodegradation; therefore, they do not decompose and take up large amounts of valuable landfill space, providing breeding sites for mosquitoes and rodents, and presenting life and health hazards.

In the case of other recyclable materials, rubber in products including tires could be recycled into new products of the same value. This means that high quality of high performance products would require high-specification recycled material. In recycle waste tires, there are four alternative management methods: reuse, recycling, pyrolysis, and energy recovery.

Pyrolysis can be considered as a nonconventional method, which seems to be very suitable for complex materials, such as tires that cannot be remoulded. It is energy and resource technology because it can extract fuel or useful chemical materials from solid waste, although thermal degradation still has some obstacles. It consumed high energy and potentially generated unwanted decomposing products. The relative proportions of the products vary, depending on the temperature of pyrolysis, in the range of 450°C up to 1000°C. The reaction temperature could be reduced and product distributions could be controlled by using a catalyst, so for this

work, the attention was paid to observation the influence of catalysts for catalytic pyrolysis of scrap tires.