CHAPTER I

INTRODUCTION

Reinforcement is defined as an ability to increase the viscosity of unvulcanized compounds and to improve a variety of vulcanizate properties, example tensile strength, abrasion resistance and tear resistance. Most of engineering rubber products cannot be used without the addition of reinforcing filler. Carbon black is well-known reinforcing filler extensively used in rubber industry. The degree of reinforcement of carbon black depends strongly on the interaction between the rubber and carbon black surface. Thus, the smaller the size of primary particle is, the higher the degree of reinforcement is. For many years although there has been an extensive study on the carbon black reinforcement of rubber, the consequences of incorporation of carbon black on the reversion behavior and thermal aging properties of rubber compounds seem to be scarce. Chen and coworker [1] found that black filled NR compounds showed better reversion resistance. It was proposed by them that the reversion improvement might be due to the adhere of rubber chains onto the carbon black surface, causing less desulfuration of polysulfidic linkages. The polysulfidic linkages now have greater thermal stability. So the reversion resistance is improved. Studebaker [2] and Porter [3] found that the network filled with carbon black consists of the higher proportion of stronger linkages, mono- and disulfidic linkages than one without carbon black. So this leads to higher thermal and reversion resistance. However, our previous studies [4] showed that adding 50 phr of carbon black N330 into natural rubber significantly increased in the reversion behavior. Due to these contrasting findings, our aims here are to evaluate the reason for these discrepancies, and also to study in more detail the effects of carbon black type and loading on the reversion behavior and thermal aging properties of the natural rubber compound.