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Effects of Wet Grinding Process on the Properties of the Ground Diatomite Particles

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Keywords: diatomite, wet grinding, grinding time, adsorption

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1. Introduction

Many industrial applications of minerals depend on their particle size and surface properties. Small-sized mineral particles exhibit superior characteristics due to its large specific surface area and surface reactivity [1]. Grinding, the most used processes in many applications, can be used for the size reduction of minerals and production of large surface. During grinding process, particle breakage and mechanical activation of the particle surfaces can occur, leading to the formation of reactive species at the particle surface [2]. Therefore, not only the size distribution of particles is modified, but also other properties of the minerals such as the specific surface area, the structure or the fragments shape, adsorption ability and cation exchange capacity [1, 3, 4].

Many researches are concerned with the change of the clay or other minerals in particle size and other properties during dry or wet grinding process. These results demonstrated the effects of the size reduction and the formation of active surface during grinding on the properties of the mineral. Neda Vdovic [1] investigated the effects of particle size reduction and the resulting structural changes on the electronkinetic and surface properties of different clay minerals, indicating that particle size reduction and morphological and structural changes accompanied by changes of the surface properties. Peng Renyong [5] showed that the physical and chemical properties of bentonite such as the cation exchange capacity, the degree of adsorption methylene blue, the Hunter whiteness, the expansion value, the gel swelling value and the rheological properties have close relation with the milling time. G. Suraj studied [4] the effect of micronization on the crystalline structure of kaolinite clay mineral and the role of this mechanically modified kaolinite structure on the adsorption/ion-exchange properties of toxic heavy metals. According to this, there is a slight improvement in adsorption for Cd and Cu, whileas there is an increased sorption for lead ions. Zhao