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Abstract
Al2O3 (Alumina) has many excellent properties so it can be applied in many fields. The process to control the morphology of alumina is quit important for it’s application. In this study, aluminum ammonium sulfate (a cheap raw material) was used to synthesize the vermiform-fiber form alumina. According to the experimental results, as used alum as the raw material, the dried process of the precipitate was the key factor to synthesize the vermiform-fiber form alumina. As the as precipitate was dried directly without filtrating, the product after calcining at 1200℃ for 1 h is the vermiform-fiber form alumina. Increasing the calcining temperature at 1500℃ 5h, the morphologies of the product became the big and wide vermiform-fiber form particles, the length was about 2.5 μm, and the width was about 700 nm. In addition, the vermiform-fiber form particle could be found in the filtrated precipitate with the additional ammonium sulfate. If the ratio of ammonium sulfate to alum is above 1, the vermiform-fiber form particle was formed. After calcined at 1500℃ 5h, the particle grow up to 2μm. Adding ammonium sulfate was also reduced the particles size of alumina because the surface area of the products was increased by increasing the quantity of ammonium sulfate. Moreover, ammonium sulfate can also affect to the morphologies of boehmite to form the vermiform-fiber particles. The vermiform-fiber alumina was found in the co-fired product of boehmite and ammonium sulfate (The ratio of boehmite to ammonium sulfate >1) at 1200℃ for 1 h. After calcining at 1500℃ 5h, the particle grow up to 3μm in length and 700nm in width. Adding ammonium sulfate in boehmite could reduce the particles size of alumina. The surface area of the products is increased by increasing the quantity of ammonium sulfate.
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