

Application of Different DS-Cationic Starches to Modified Talcs Filled Paper

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ABSTRACT

Fillers play important roles in the manufacturing of fine paper. Because fillers are cheaper than pulp fibers, proper application of inorganic minerals as fillers can effectively reduce production cost. Adding fillers in papermaking wet end can increase drainage rate, paper brightness and opacity, however, filler particles tend to interfere hydrogen bonding among fibers leading to decreased strength properties. In this study, commercial cationic starch and self-prepared cationic starch were gelatinized and used to modify surface charges of talc plates which were then added with calcium carbonate to pulp stocks in a bid to increase the tendency of filler particles attaching to fibers and thus increase paper physical properties and filler retention rates. The results indicated that adding cationic starch modified talc could increase paper ash retention, tensile index, tear index and first pass retention of the pulp, however, at the cost of brightness, opacity and paper bulk losses. When commercial cationic starch modified talc was added, the first pass retention reached 97.6%, ash content of the handsheets increased from the original 6.33% to 25.53%. While handsheets tensile index increased from 27.70 to 48.8 Nm/g; tear index from 3.36 to 5.25 mN m²/g. With self-prepared cationic starch modified talc, the first pass retention reached 96%, while ash content of the handsheet increased from 6.33% to 25.91%; tensile index increased from 27.70 to 55.34 Nm/g; and tear index increased from 32.6 to 5.65 mN m²/g. Scanning electronic micrographic observations indicated that after starch gelatinization, the modified talc could better retained on the fibers and fiber interstices, causing handsheet ash content to increase and strengthening the paper as well.

Keywords : cationic starch、talc、calcium carbonate、papermaking wet end、fillers、degree of substitution

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