

奈米材料在造紙業之應用實績與發展趨勢

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Practical Applications and Developmental Trends of Nano-Materials in Papermaking Industry.

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ABSTRACT

Application of nano-materials can be traced to 1990's, mainly for wet-end retention systems, internal fillers, coating colors, pitch trouble/stickie suppressors 4 categories.

Due to synchronized development of colloidal silica products and application of swelling montmorillonite in wet-end papermaking application, traditional single agent retention system gradually become dual or triple retention systems that lead to effective retention of fines and fillers and improved formation. In the field of filler and coating color application, precipitated calcium carbonate an amorphous silica/silicate can now replace titanium dioxide as functional coating colors or fillers that can lower production costs and raise quality. In addition, Along with development of miniature plastic fillers and SBR latex, coating layer strength has effectively improved together with bulk, smoothness, optical properties and runnability. Domestically produced high purity and high specific surface talc powder has commercialized and proven effective in suppressing pitch/stickie problems. On the other hand, Submicron native sericite has successfully developed its role in wet-end functional filler and as a functional waterproofing coating color.

Key words: Nano-materials, wet-end, filler, pigment, pitch, stickie.

一、前言

在製漿造紙業的製程中，使用或原存在許多有機或無機的細小顆粒材料，作為濕端內添填料或保留助劑或表面塗佈塗料的應用，絕大部份的顆粒粒徑尺度在微米級至次微米級範圍，有部份甚至微細至奈米級，造紙濕端製程中各典型原料及藥料的相對尺度說明於表 1 及圖 1⁽¹⁾，典型塗佈塗料及濕端內添填料(白土、碳酸鈣、二氧化鈦)的粒徑尺度說明於圖 2⁽²⁾。依目前對於奈米尺度的定義：材料或界面介於 1 到 100 nm 尺寸之大小稱之為奈米材料。則奈米材料在製漿造紙業的應用應可追溯至 90 年代，甚至更早，主要應

用在濕端保留系統、內添填料及塗佈塗料應用、樹脂障礙(pitch trouble) /黏著物障礙(sticky trouble)的排除、功能性特殊紙等領域。