ENVIROFIL® PCC

Sustainable PCC from deinking residues

ENVIROFIL® PCC

Assessing Value for Deinked Pulp & Paper Mill

Environmental Drivers

- Supports **Sustainability** goals
- **Reduce residuals to landfill** or offsite disposal
- **Lower carbon dioxide** and particulate emissions (less lime input to PCC plant)

Economic Benefits

- **Reduce Landfill Cost**
- **Reduce "lime" use/cost** per ton of PCC
- Provide **cost effective filler**

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SMI development

- Patented process
  - **US Patent 10,400,395 B2 Date: Sep 3, 2019. PROCESS FOR PREPARING A PCC COMPOSITE PRODUCT**

    Abstract
    The current invention relates to methods of the recovery and re-use of minerals obtained from the combustion of the residues of a process to recycle paper
- $CaCO_3$ content in waste-paper led to increased CaO in boiler ash from the combustion of deinking residue
- Precipitation on ash substrates provides two advantages
  - ✓ Reduced abrasivity of the resulting ENVIROFIL® PCC
  - ✓ Potential better optics depending on ash composition
- ENVIROFIL® PCC commercialized 2019 in Germany
- “Good” boiler ash can economically displace CaO in a process to manufacture PCC

ENVIROFIL®PCC – Calcium Carbonate

Lime

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Ash

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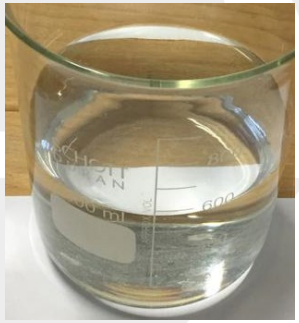

Water

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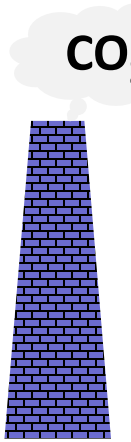

Flue gas

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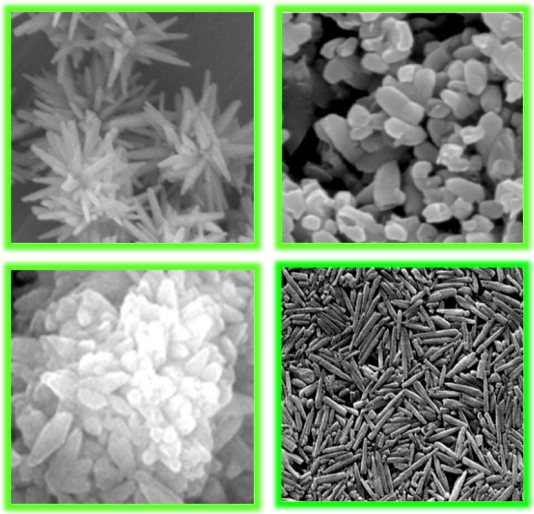

Precipitated Calcium Carbonate

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High level process description

Deinking Residue

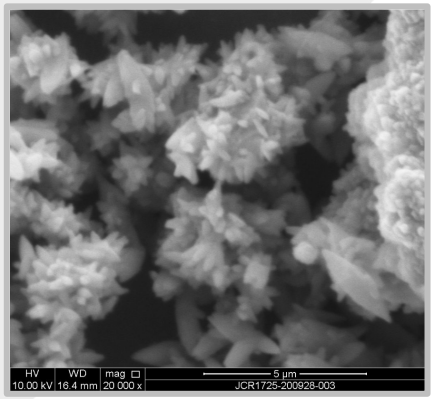
Heat, Air

COMBUSTION

CO_2 + Heat + Boiler Ash

SMI ENVIROFIL® PCC PROCESS

+ $Ca(OH)_2$



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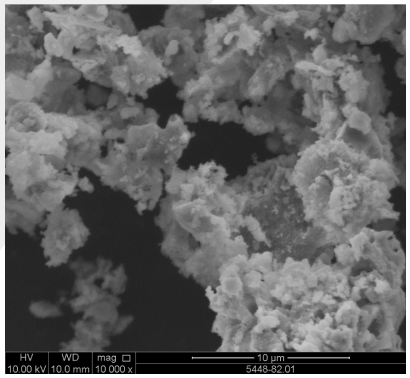
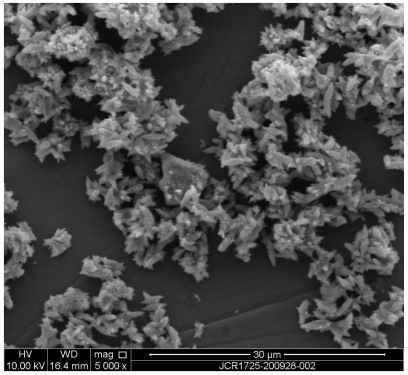
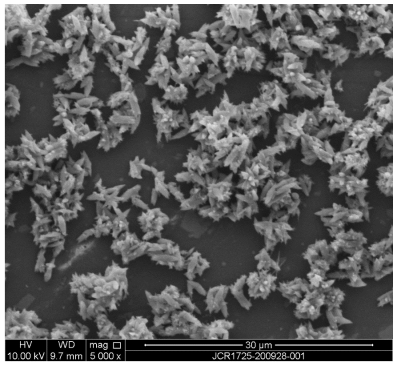
High level ENVIROFIL® PCC precipitation overview

- CaO is converted to PCC
- Calcite is essentially reused
- Aluminum & Silicate Minerals Are Partly or Entirely Converted to Calcium Aluminates & Calcium Silicates
- Product is a Blend of PCC & Mixed Minerals

ENVIROFIL® PCC PRINCIPLE

Ash for disposal	ENVIROFIL® PCC containing X% of ash	ALBACAR® PCC
		
ISO Brightness R-457 40-70%	ISO Brightness R-457 72-91%	ISO Brightness R-457 95-96%
		

ENVIROFIL® PCC

Process / Product implementation

Typical Steps to Implementation

- Characterize the boiler ash from the target mill
  - XRD; CaO, Calcite, Portlandite, Gehlenite, Quartz, Ca_2SiO_4 type phase
  - Ash available CaO (%) titration
  - Ash particle size distribution (Horiba wet PSD, µm)
  - Ash optical properties (ISO Brightness, Y-value, b*value)
- Prepare & test ENVIROFIL® PCC prototypes
- Laboratory scale testing
- Commercial scale trials
- Commercial agreement