paper coating processes. This waste is a result of coating that has been added to the process but which for one reason or another does not end up coating the paper surface. In some cases this waste can be as much as 4% of the total applied coating. Common practice is to dewater and compact this waste coating and to simply dump it into landfills or burn it. Many mills use hundreds of thousands, if not millions of tons of coating, resulting in tens of thousands of tons of waste being generated annually. This results in both terrible environmental costs as well as a significant waste of economic resources. Thus there is clear need and novel utility in a method of recycling coating waste generated in a papermaking process. The art described in this section is not intended to constitute an admission that any patent, publication or other information referred to herein is "Prior Art" with respect to this invention, unless specifically designated as such. In addition, this section should not be construed to mean that a search has been made or that no other pertinent information as defined in 37 CFR § 1.56(a) exists.

Brief Summary ~~of the Invention~~

At least one ~~embodiment~~aspect of the ~~invention~~present disclosure is directed towards a method of incorporating waste coating in a paper sheet of a papermaking process. The method comprises the steps of: 1) providing a furnish comprising at least cellulose fibers and water, filler particles, and waste coating from a previous papermaking coating process, 2) mixing the waste coating and the fresh filler particles to form a mixture, 3) optionally adding a defoamer to the mixture, 4) adding a cationic agent to the mixture, 5) adding a first flocculating agent to the mixture in an amount sufficient to mix uniformly without causing significant flocculation of the filler and coating waste, the first flocculating agent being a flocculant; 6) adding a second flocculating agent to the mixture after adding the first flocculating agent, in an amount sufficient to initiate

flocculation of the filler and coating waste in the presence of the first flocculating agent, the second flocculating agent being of opposite charge to the first flocculating agent, the flocculated mixture of fresh filler and coating waste defining a filler material, 7) optionally, shearing the flocculated mixture of fresh filler and coating waste to provide flocs having the desired particle size, and 8) mixing the filler material within the furnish.

The waste coating may comprise water and water may be a majority of the mass of the waste coating. The coating waste may comprise at least one pigment from the list consisting of: precipitated calcium carbonate, ground calcium carbonate, kaolin clay, titanium dioxide, plastic pigments, and any combination thereof. The coating waste may comprise at least one binder from the list consisting of: starch, styrene-butadiene resin, styrene-acrylate copolymer, styrene-acrylic acid resin, and any combination thereof. The cationic agent may be one selected from the list consisting of: a starch, a flocculant, a coagulant, and any combination thereof. The first flocculating agent may be selected from the group consisting of cationic, anionic, nonionic, zwitterionic and amphoteric polymers. The second flocculating agent may be selected from the group consisting of microparticles, coagulants and cationic, anionic, nonionic, zwitterionic and amphoteric polymers and mixtures thereof. The second flocculating agent and first flocculating agent may be oppositely charged. The first flocculating agent may be anionic and the second flocculating agent may be cationic. The preflocculated mixture of coating waste and fresh filler may have a median particle size of 10-70 μm. Substantially 100% of the coating pigments and binders may be flocculated with the filler material. The solids content of the coating waste may be between 0.5% and 10%. The relative amounts of filler particles and coating particles are between 50 to 98% filler particles and 2% to 50% waste coating particles.

At least one ~~embodiment~~aspect of the ~~invention~~present disclosure is directed towards a sheet of paper manufactured in a papermaking process according to the above method.

4. The method of claim 1 in which the coating waste comprises at least one binder from the list consisting of: starch, styrene-butadiene resin, styrene-acrylate copolymer, styrene-acrylic acid resin, and any combination thereof.

5. The method of claim 1 in which the cationic agent is one selected from the list consisting of: a starch, a flocculant, a coagulant, and any combination thereof.

6. The method of claim 1 wherein the first flocculating agent is selected from the group consisting of cationic, anionic, nonionic, zwitterionic and amphoteric polymers, the first flocculant agent being a flocculant

7. The method of claim 1 wherein the second flocculating agent is selected from the group consisting of microparticles, coagulants and cationic, anionic, nonionic, zwitterionic and amphoteric polymers and mixtures thereof.

8. The method of claim 1 wherein the second flocculating agent and first flocculating agent are oppositely charged.

9. The method of claim 19 wherein the first flocculating agent is anionic and the second flocculating agent is cationic.

10. The method of claim 1 wherein the preflocculated mixture of coating waste and fresh filler have a median particle size of 10-70 μm.

11. The method of claim 1 in which substantially 100% of the coating pigments and binders are flocculated with the filler material.

12. The method of claim 2 in which the solids content of the coating waste is between 0.5% and 10%.

13. The method of claim 1 in which relative amounts of filler particles and coating particles are between 50 to 98% filler particles and 2% to 50% waste coating particles.