



## Nanocoating for Effective Paper Recycling

(ROIs # 2004-09 and 2005-18)

### Description

- This technology is based on the pioneering work of Dr. Yuri Lvov (<http://www2.latech.edu/~ylvov/>) in the area of layer-by-layer nanoassembly.
- Layer-by-layer (LbL) assembly is a nanofabrication technique which has been used to produce multilayer coatings with nanometer precision through alternate adsorption of oppositely charged components.
- Using LBL process lignocellulose fibers (e.g., recycled pulp or mill waste “broke”) are coated with a thin layer of strength enhancing material. These nanocomposite wood fibers are then integrated into existing paper making processes to produce paper.
- This process can be adapted to produce paper with varying properties.

### Advantages

- Process allows for a dramatic increase (2x) in use of recycled paper without a loss in paper tensile strength
- Potential for huge cost savings because process allows for the use of a higher percentage of recycled pulp to virgin pulp
- Possibility to work with dirty water (mill black water) and re-use of the materials.
- Very simple process that can be easily scaled-up and integrated into existing mills.
- Low materials cost due to very thin polyelectrolyte coating.

### Areas of Application

- Treatment of mill broke or recycled pulp for its re-use in paper making.
- Possibility to process existing depots of dry mill broke for its recycling.

### Patents

- US 7,842,162

### References

- Zheng et al, “Layer-by-layer nanocoating of lignocellulose fibers for enhanced paper properties,” *J Nanosci Nanotechnol*, (2006), **6**(3), pp. 624-32.