Spin Spray Layer-by-Layer Assembly Systems and Methods

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Description:
Layer-by-layer (LBL) assembly has emerged out of a range of disciplines including Biology, Chemistry, Chemical Engineering, Materials Science, Mechanical Engineering, Electrical Engineering, and Applied Physics. This interdisciplinary area is promising for a wide variety of industries, especially for energy conversion and storage (e.g. fuel cells, solar cells, batteries). Yet in order for the full potential of the LBL approach to be realized, rigorous research into how materials are synthesized and arranged needs to be conducted. This invention describes an integrated system that has been developed to address these challenges.

Spin Spray Layer-by-Layer (SSLBL) Assembly is a new method for speeding up the process of making layer by layer assembled thin films. It reduces cycle times up to three orders of magnitude and can reduce material waste considerably over comparable processes. By spraying rotating substrates with polyelectrolytes and nanocolloids that interact through different mechanisms, we can perform the common process of layer by layer assembly much more efficiently.

Advantages: Reduces cycle time (up to three orders magnitude), reduces material waste, exceptionally efficient process

![Diagram of traditional and spin spray LBL process]

Traditional Layer-by-Layer (LBL),

Spin Spray Layer-by-Layer (SSLBL)

Stage of Development: Roll to roll prototype development
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