Compensator Control For Chemical Vapor Deposition Film Growth Using Reduced Order Design Models

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Abstract

We present a summary of investigations on the use of proper orthogonal decomposition (POD) techniques as a reduced basis method for computation of feedback controls and compensators in a high pressure chemical vapor deposition (HPCVD) reactor that includes multiple species and controls, gas phase reactions, and time dependent tracking signals that are consistent with pulsed vapor reactant inputs. Numerical implementation of the model-based feedback control uses a reduced order state estimator, based on partial state observations of the fluxes of reactants at the substrate center, which can be achieved with current sensing technology. We demonstrate that the reduced order state estimator or compensator system is capable of substantial control authority when applied to the full system.