The preparation of C/C composites with propane by CVI and the mathematical modeling

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The process of the preparation of C/C composites by the chemical vapor infiltration (CVI) of propane was studied. Pyrolysis carbon was deposited on the lateral surfaces of carbon fibers in the layered preform. In this work, we have studied the pyrolysis of propane at low pressures. The temperature ranges from 1,173 to 1,233 K and the pyrocarbon was produced with 3 torr of propane diluted in nitrogen at a total pressure of 30 torr. The amount of deposited carbon and the compositions of the exit gas after the deposition reaction were measured. Changes of the shapes of deposited carbon in the pores of preform were confirmed with SEM photos. The products of propane pyrolysis in the exit gas were analyzed with GC. The mathematical modeling of the system with the deposition rate constant from the reference estimated the experimental results well.