Global well-posedness of coupled parabolic systems for two-component combustion

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The initial boundary value problem of a class of reaction-diffusion systems (coupled parabolic systems) with nonlinear coupled source terms is considered in order to classify the initial data for the global existence, finite time blowup and longtime decay of the solution for two-component combustion. The whole study is conducted by considering three cases according to initial energy: low initial energy case, critical initial energy case and high initial energy case. For the low initial energy case and critical initial energy case the sufficient initial conditions of global existence, long time decay and finite time blowup are given to show a sharp-like condition. And for the high initial energy case the possibility of both global existence and finite time blowup is proved first, and then some sufficient initial conditions of finite time blowup and global existence are obtained respectively.