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**Study on the analog system of non-ideal detonation with two step chemical reaction model** YUANXIANG SUN, State Key Lab. of Explosion Science and Tech., Beijing Institute of Tech. , CHENG WANG, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, China — In this paper, the analog system is used to analyze the critical characteristics of non-ideal detonation and detonation instability: 1. The analog system of detonation with loss and the chemical reaction of two step reaction model is built, wherein an induction zone is followed by energy and heat release zone. Steady state of detonation wave structures are obtained by analytic method. By changing the value of the sensitivity exponent of reaction rate and the sensitivity coefficient of loss rate, the diagrams of steady detonation velocity and the loss coefficient under the corresponding parameter and detonation failure of linear boundary are obtained. And, the critical characteristics of detonation failure is obtained by theoretical analysis. 2. By the linear stability of the normal mode analysis, the spreading condition which limit the spread of the disturbance to the upstream is obtained. The stability of the steady state solution under the condition of the ideal and non-ideal (with loss) analog system of detonation is studied, and the influence of related parameters on the stability is analyzed.

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