amna Ali S. Abu Weden* (aabuweden2014@my.fit.edu) and ugur Abdulla. Interface Development for the Nonlinear Degenerate Multidimensional Parabolic Equations Modeling Reaction-Diffusion Processes.

We present a full classification of the short-time behavior of the interface in the Cauchy problem for the nonlinear second order degenerate parabolic PDE

\[
    u_t - \Delta u^m + bu^\beta = 0, \quad x \in \mathbb{R}, \quad t > 0
\]

with nonnegative and radially symmetric initial function \( u_0 \) such that

\[
    \text{supp } u_0 \subset \{ |x| < R \}, \quad u_0 \sim C(R - |x|)^\alpha, \quad \text{as } |x| \to R - 0,
\]

where \( m > 1, C, \alpha, \beta > 0, b \in \mathbb{R} \). Interface surface \( t = \eta(x) \) may shrink, expand or remain stationary depending on the relative strength of the diffusion and reaction terms near the boundary of support, expressed in terms of the parameters \( m, \beta, \alpha, \text{sign } b \) and \( C \). In all cases we prove explicit formula for the interface asymptotics, and local solution near the interface. (Received August 31, 2018)