On the stagnation-point flow towards a stretching sheet with homogeneous-heterogeneous reactions effects.

ABSTRACT

The effects of homogeneous-heterogeneous reactions on the steady boundary layer flow near the stagnation point on a stretching surface is studied. The possible steady-states of this system are analyzed in the case when the diffusion coefficients of both reactant and auto catalyst are equal. The strength of this effect is represented by the dimensionless parameter K and Ks. It is shown that for a fluid of small kinematic viscosity, a boundary layer is formed when the stretching velocity is less than the free stream velocity and an inverted boundary layer is formed when the stretching velocity exceeds the free stream velocity. The uniqueness of this problem lies on the fact that the solutions are possible for all values of $\lambda>0$ (stretching surface), while for $\lambda<0$ (shrinking surface), solutions are possible only for its limited range.

Keyword: Homogeneous–heterogeneous reactions; Stagnation-point flow; Stretching sheet.