

## عنوان مقاله:

Boundary Layer Solution with Langmuir Slip Condition

## محل انتشار:

شانزدهمین کنفرانس سالانه بین المللی مهندسی مکانیک (سال: 1387)

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## خلاصه مقاله:

Recent studies and experiments show that conventional slip Models unable to predict important flow features in complex geometries for example increase in the mass flow rate. Langmuir slip condition originating from surface chemistry has been introduced to cover weakness of classical slip models. Under this discipline, gas-surface interaction is explained by adsorption theory. Gas molecules are adsorbed to surfaces for a short period time, namely, residence time, and reflected according to the scale of adsorption energy potential. The residence time of adsorption can be interpreted as wall slip effect from the macroscopic viewpoint. This slip condition does not need the accommodation coefficient or calculation of the velocity gradient. It may also be theoretically well defined in a lucid way so that the differences among monatomic, diatomic, and polyatomic gases can be clearly expressed. Adding Langmuir slip condition, Blasius boundary layer solution for flow over stationary and moving flat plate has been resolved using similarity solution and the results have been compared with classical Maxwell Model through relation that linked two models. Although slip conditions cause self similarity of the Blasius solution to lost, However because conservation of mass and momentum are satisfied in the same approximate manner as in the Blasius solution the approach remains valid. Despite the similar results for the two methods, the Langmuir slip condition is still superior to the other methods since it has sound theoretical and physical bases, solid boundedness of the slip velocity, and inexpensive computation cost.

## کلمات کلیدی:

slightly rarefied gas, MEMS, similarity solution, moving flat plate, Langmuir Slip Model

## لینک ثابت مقاله در پایگاه سیویلیکا:

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