

## Prediction of Thermodynamic Derivative Properties of Pure Fluids using the Crossover Cubic Equation of State

이용진, 신문삼, 김화용\*  
서울대학교  
(hwayongk@snu.ac.kr\*)

The heat capacities, the isothermal compressibility, the thermal expansion coefficient, the Joule-Thomson coefficient, and the speed of sound are second order derivative properties of a thermodynamic potential function. These properties are essential for the accurate design of several industrial processes.

In this research, we use the Cubic equation of state and develop a Crossover Cubic(Xcubic) equation of state from singular critical to regular classical Thermodynamic Behavior of Fluids which incorporates the scaling laws valid asymptotically close to the critical point while reducing to the original classical Cubic EOS far from the critical point. We show that, over a wide range of states, the Xcubic EOS yields the second order derivative properties with a much better accuracy than the classical Cubic EOS.