

Abstract Submitted
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Partial Molar Volume of Helium Dissolved in Hydrogen MADE-LINE SMITH, M.S. PETTERSEN, Washington and Jefferson College — We have determined the partial molar volume v' of helium dissolved in hydrogen, by analyzing existing data on the concentrations of the liquid and the coexisting vapor phase at high pressures. The partial molar volume can be found from the chemical potential of the helium in solution ($v' = \partial\mu_2/\partial p|_{T,X_2}$, where μ_2 is the chemical potential of the helium in solution, and X_2 its concentration), and the chemical potential can be determined from pressure and the concentration of the vapor phase, after applying virial corrections. Both v' and the virial terms lead to corrections to Henry's law. Over the range studied (0-50 bar and 15.5-29 K), we find that the partial molar volume of helium is equal to the molar volume of pure hydrogen, within a few percent. The results are relevant to recent experiment on the wetting of cesium by helium/hydrogen solutions, and may also have astrophysical applications.

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