Invited Lecture IL 06

Mercury Solubility Measurements in Glycols and Amines for Natural Gas Processing Plant

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Key Word (3 words)

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Abstract (less than 300 words)

Natural gas produced from in-situ reservoir sometimes contains small amount of mercury (Hg). The knowledge of Hg behavior is now an important matter on natural gas processing for proper handling of Hg. After oil and water contents are roughly separated from the natural gas at the separator, the natural gas is sent to acid gas removal and dehydration process. Then, amine and glycols have been widely employed as absorbents in these process. In this research, for the design of mercury removal units, solubilities of elemental mercury were measured in ethylene glycols (MEG), diethylene glycols (DEG), Triethylene glycols (TEG) and N-methyldiethenolamaine (MDEA) under the atmospheric pressure at (303-333) K [1]. The solubilities were measured by an apparatus based on a static method The sample was prepared under the nitrogen atmosphere to avoid the oxidation of elemental Hg, and it was in the vapor-liquid-liquid mercury equilibrium. The concentration of elemental Hg, in liquid, glycols and amine, was determined by a total Hg analyzer, which is based cold-vapor atomic absorption spectroscopy with the wavelength of 253.7 nm. The solubilities ranged from 5.64×10^{-8} to 6.34×10^{-7} in the mole fraction of Hg, and showed a temperature dependence followed van't Hoff equation with the dissolution enthalpies around 23 kJ/mol. The ratio of the mole fraction of elemental Hg was found to be the same as that of the numbers of carbon and oxygen in the main chain in the molecules at 303 K. The solubilities were also correlated with Peng-Robinson equation of states modified for elemental Hg in our previous research [2]. The calculation results will be described in the presentation together with those for Hg solubility in high pressure methane [2].

References

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