**A simplified model correlating the excess proprieties for Bi-X binary systems**

**(X=Cu, Sb) serving the concept of reduced Redlich-Kister function at different temperatures**

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Thermophysical properties are important once they permit mathematical models to realistic represent physical phenomena. The surface tension allows understanding fluid interactions, by establishing an elastic stretched interface between them. The molar volume is a very basic property to materials. For instance, viscosity and surface tension are dependent on the molar volume. Determination of both properties is necessary in many branches of physics, chemistry and engineering. To the best of our knowledge has studied no one has treated the new concept of reduced RK function on the two binary metals Bi-X (*X* = Cu, Sb) and suggested for the some physicochemical properties of these alloys, a new simple expression with small number of interaction parameters replacing the RK polynomial. Indeed, the molar volume and surface tension of binary alloys Bi-X(*X*=Cu, Sb) are carried out whole range of mole composition at atmospheric pressure and temperatures range 623 K-1123 K by using theoretical and Butler equations, respectively, these calculations were done for the reason of understanding the influence of diverse types of interactions in binary alloys at state liquid by applying the correlative Redlich–Kister equation. All of the points addressed in this study provide an understanding of the evolution of thermo-physical properties of Bi-X(*X*=Cu, Sb) alloys as a function of temperature and of the composition. Moreover, we have introduced at a first time the new concept of reduced R-K function for metal liquid alloys. In the same context, we suggest for the surface tension of the system Bi-X (*X*=Cu, Sb), an original explicit expression with few parameters substituting the R-K polynomial by a homographic simple form which has an excellent agreement and can be generalized for similar binary alloy having a single sign of their excess properties in the composition range.

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