

New Data for the SURDAT–Data Base of Modeled and Experimental Physical Properties of Lead-Free Solder Alloys

Władysław Gašior^S, Zbigniew Moser^C, Adam Dębski and Janusz Pstruś
*Polish Academy of Sciences, Aleksander Krupkowski Institute of Metallurgy and Materials Science,
Kraków, Poland*

Experimental studies of surface tension and density by the maximum bubble pressure method and dilatometric technique were carried out and compiled with almost over ten years results for liquid pure components, binary and multicomponent alloys in order to create the SURDAT database [1] of the Pb-free soldering materials (available free of charge on website <http://www.imim.pl>). The implementation of experimental contact angles, wettability force, wettability time, interfacial tension and differential thermal analysis data into the SURDAT database has been initiated in the last 2 years as a result of cooperation with industrial institutes. Additionally, a new computer software for calculation of viscosity based on the models proposed by Moelwyn-Hughes [2], Iida-Ueda-Morita [3,4], Seetharaman-Du Sichen [5], Kozlov-Romanov-Petrov [6] and Kaptay [7] was developed. The modification of Moelwyn-Hughes model was proposed for binary alloys, with positive deviations from the ideal behavior by the introduction of the correction factor $k_H = f(\Delta H_{\max})$ which depends on the maximal value of the enthalpy of mixing ΔH_{\max} of liquid alloys. The calculated viscosity of some binary systems showed satisfactory agreement with those from experiments. The cooperation with Alberta University in Edmonton was initiated on this matter and the experimental data of viscosity obtained with the capillary and dynamic flow method will be accessible in SURDAT database in future. All the old and new data will be available on the website of Institute of Metallurgy and Materials Science in a new electronic and book edition of the SURDAT database being in preparation.

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