must be pointed out that not all systems are amenable to derivation of thermodynamic properties in this way.

Higher Order Systems

From assessed binary data sets, thermodynamic properties of ternary systems may be estimated using the empirical relationship:

$$\Delta G^{xs}_{ABC} = X_A X_B[A\text{–}B] + X_B X_C[B\text{–}C] + X_C X_A[C\text{–}A] + X_A X_B X_C K$$

where [A–B] represents the square-bracketed term in equation [iii], and [B–C] and [C–A] represent the equivalent terms for B–C and C–A binary systems. Where ternary data is available, the coefficient K may be adjusted to give the optimum fit. A small amount of ternary data in combination with the three sets of binary coefficients may give a good representation of the whole ternary system.

In summary, it has been shown that phase diagram measurements used in conjunction with a few thermodynamic data points may be sufficient to allow a full thermodynamic description of a binary system to be achieved. Equally, uncertainties in phase diagrams, particularly at low temperatures where kinetics are slow, may be resolved by the use of thermodynamic data measured at a higher temperature. However, the advantages of self-consistent phase diagram and thermodynamic data sets are not so much that they resolve problems in the binary systems, but that the information may be used to investigate more complex, higher order systems, with a minimum of experimental work and, of course, expense.

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Protecting Steel Reinforcement Embedded in Concrete

The application of platinum in cathodic protection systems designed to inhibit the corrosion of ships and marine structures is now well established. In addition platinised electrodes are used for the protection of underground structures such as storage tanks, buried pipelines and oil well casings. Similar electrodes may also find use on surface structures, such as bridges and multi-storey car parks.

A recently published invention relates to the cathodic protection of steel in concrete (Taywood Engineering Limited, *British Appl.* 2,140,456A). Previously, asphalt/concrete electrical ground beds could only be applied to surfaces that were, at least approximately, horizontal. Now it is claimed that an electrically conductive film, containing a suitable conducting pigment, enables a ground bed to be applied to undersurfaces or to the upright columns of a structure.

The primary anodes, which are stuck to the concrete structure and subsequently covered with the conductive paint, consist of titanium or niobium coated with platinum. These anodes are connected to the positive terminal of a DC system while the steel reinforcement is joined to the negative terminal, to constitute the cathode.