Addendum

In Vol. 12, No. 3, page 301 ("The Fe-Ni (Iron-Nickel) System," by L.J. Swartzendruber, V.P. Itkin, and C.B. Alcock), in Table 6 three figures contained incorrectly placed decimal points. In the first line following the subhead "bcc phase," 11 736.4 should be 127 364. In the first line following the subheading "fcc phase," 11 274 should be 112 740, and in the second line following that subhead 3667.6 should be 36 676. An additional sentence has been added to the table note, "Values are valid only for $T > 500$ K." The complete table is printed below in its revised form. These changes are also applicable to this table as printed in "Fe-Ni (Iron-Nickel)" in *Phase Diagrams of Binary Nickel Alloys*, P. Nash, Ed., ASM International (1991). The correct table is printed in this evaluation in *Phase Diagrams of Binary Iron Alloys*, H. Okamoto, Ed., ASM International, to be published (1993).

Table 6 Thermodynamic Parameters Used to Model the Fe-Ni Phase Diagram

Liquid phase

$G(\text{Fe,L}) = 0$

$G(\text{Ni,L}) = 0$

$G^{ex}(\text{L}) = X_{Fe}X_{Ni}[-16\,391 + 3.17\,T + (12\,075 - 2.6\,T)(X_{Fe} - X_{Ni}) + (-2000 + T)(X_{Fe} - X_{Ni})^2 + (-1500 - T)(X_{Fe} - X_{Ni})^3]$

bcc phase

$G(\text{Fe,bcc}) = 127\,364 - 17.216\,T + 23.18\,T \ln T - 0.0048155\,T^2$

$G(\text{Ni,bcc}) = -12\,500 + 9\,T$

$G^{ex}(\text{bcc}, T > 1667\text{ K}) = X_{Fe}X_{Ni}[1950 - 3.05\,T + (-2000 + T)(X_{Fe} - X_{Ni})^2 + (-1500 - T)(X_{Fe} - X_{Ni})^3]$

$G^{ex}(\text{bcc}, T < 1185\text{ K}) = X_{Fe}X_{Ni}[13\,274 - 13\,T + (-2000 + T)(X_{Fe} - X_{Ni})^2 + (-1500 - T)(X_{Fe} - X_{Ni})^3]$

$G^{ex}(\text{bcc}, 500 < T < 1850\text{ K}) = X_{Fe}X_{Ni}(9381 - 8.775\,T)$

$G(\text{bcc,mag}) = RT_C(\text{bcc}) \ln[\beta(\text{bcc}) + 1] f(t)$

$t = T/T_C(\text{bcc})$

$f(t < 1) = -0.9053 + t - 0.153\,t^4 - 0.068\,t^{10} - 0.00153\,t^{16}$

$f(t > 1) = -0.06417\,t^{-4} - 0.002037\,t^{-14} - 0.0004278\,t^{-24}$

$T_C(\text{bcc}) = 1043X_{Fe} + X_{Fe}X_{Ni}[-757.6 + 1946(X_{Fe} - X_{Ni}) + 2153(X_{Fe} - X_{Ni})^2 - 2779(X_{Fe} - X_{Ni})^3]$

$\beta(\text{bcc}) = 2.22X_{Fe} + X_{Fe}X_{Ni}[1.176 + 1.445(X_{Fe} - X_{Ni}) + 2.275(X_{Fe} - X_{Ni})^2 - 2.042(X_{Fe} - X_{Ni})^3]$

fcc phase

$G(\text{Fe,fcc}) = 112\,740 - 16.3878\,T + 22.03\,T \ln T - 0.0041755\,T^2$

$G(\text{Ni,fcc}) = 36\,676 - 14.4177\,T + 20.113\,T \ln T - 0.004561\,T^2$

$G^{ex}(\text{fcc}) = X_{Fe}X_{Ni}[-15\,291 + 3.47\,T + (12\,061 - 2.5\,T)(X_{Fe} - X_{Ni}) + (-2000 + T)(X_{Fe} - X_{Ni})^2 + (-1500 - T)(X_{Fe} - X_{Ni})]$

$G(\text{fcc,mag}) = RT_C(\text{fcc}) \ln[\beta(\text{fcc}) + 1] f(t)$

$t = T/T_C(\text{fcc})$

$f(t < 1) = -0.5597 - 0.6315\,t - 0.09178\,t^4 + 0.001872\,t^{10} - 0.007715\,t^{16}$

$f(t > 1) = -0.03184\,t^{-4} + 0.002468\,t^{-14} - 0.0019904\,t^{-24}$

$T_C(\text{fcc}) = -80X_{Fe} + 627.4X_{Ni} + X_{Fe}X_{Ni}[2040.5 - 1250(X_{Fe} - X_{Ni}) - 2627(X_{Fe} - X_{Ni})^2 - 1784(X_{Fe} - X_{Ni})^3]$

$\beta(\text{fcc}) = -1.59X_{Fe} + 0.62X_{Ni} + X_{Fe}X_{Ni}[8.644 + 7.691(X_{Fe} - X_{Ni}) + 4.435(X_{Fe} - X_{Ni})^2 + 0.585(X_{Fe} - X_{Ni})^3]$

$FeNi_3$ phase

$G(\text{Fe in FeNi}_3) = 1127.4 - 16.388\,T + 22.03\,T \ln T + 0.0041755\,T^2$

$G(\text{Ni in FeNi}_3) = 3667.6 - 14.418\,T + 20.11\,T \ln T - 0.0045610\,T^2$

$G^{ex}(\text{FeNi}_3) = X_{Fe}X_{Ni}[-24\,185 + 1.9\,T + 21\,475(X_{Fe} - X_{Ni}) + (-1700 + T)(X_{Fe} - X_{Ni})^2 + (-1500 - T)(X_{Fe} - X_{Ni})^3]$

$G(\text{FeNi}_3\text{,mag}) = RT_C(\text{FeNi}_3) \ln[\beta(\text{FeNi}_3) + 1] f(t)$

$t = T/T_C(\text{FeNi}_3)$

$f(t < 1) = -0.5597 - 0.6315\,t - 0.09718\,t^4 + 0.001872\,t^{10} - 0.007715\,t^{16}$

$f(t > 1) = -0.03184\,t^{-4} + 0.002468\,t^{-14} - 0.0019904\,t^{-24}$

$T_C(\text{FeNi}_3) = -80X_{Fe} + 627.4X_{Ni} + X_{Fe}X_{Ni}[2040.5 - 1250(X_{Fe} - X_{Ni}) - 2627(X_{Fe} - X_{Ni})^2 - 1784(X_{Fe} - X_{Ni})^3]$

$\beta(\text{FeNi}_3) = -1.59X_{Fe} + 0.62X_{Ni} + X_{Fe}X_{Ni}[8.644 + 7.691(X_{Fe} - X_{Ni}) + 4.435(X_{Fe} - X_{Ni})^2 + 0.585(X_{Fe} - X_{Ni})^3]$

Note: X_{Fe} and X_{Ni} are atomic fractions; Gibbs energy values are in J/mol; and T is in K. Values are valid only for $T > 500$ K.