REPLY TO COMMENT ON "SOME CALCULATIONS OF VACANCY CHARACTERISTICS IN SUBSTITUTIONAL ALLOYS"

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Following is our remark in reply to the preceding comment by Sprusil (1) on our recent paper. (2) The first point he stresses is the discrepancy between the ordinary theory and ours in the expression for the vacancy concentration in pure metals. We have also been aware of this fact, and consider that this is due to the approximate nature of our entropy expression, which is inherent in Cowley's method (3) of counting the number of complexion for the arrangement of atoms and vacancies. In the ordinary theory (4) the entropy is obtained more accurately at the expense of the statistical correlation between vacancies, but in ours the latter was taken into account, and we had to content ourselves with the less accurate estimate for the entropy. We are now trying to improve our approximation, and the result will be published elsewhere.

The next point which he refers to as "divacancy catastrophe" is just superfluous. Our equations (12) and (13) # are only the result of a rough approximation for the case when the vacancy and divacancy concentrations are small. Thus, if it turned out that $C_{2v}$ were large with the use of these equations, we have to go back to our original equations (9), and recalculate the solution which should yield a reasonable value for the concentration.

#The factor $\frac{1}{2}$ should be introduced on the right-hand side of equation (13).

References
1. B. Sprusil, Scripta Met. 6, 563, (1972)
2. C. Kinoshita & T. Eguchi, Acta Met. 20, 45 (1972)