Counter Comment to Dr. Kuznietz
for his Comments

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The following is our answer to Kuznietz comments.

The first point to be noted relates to his reference to de Novion & Costa's data as "previous", which is not correct. Our note(1) was presented in January 23, 1970 and published in May, whereas the work by de Novion & Costa(2) was presented in May 11, 1970 and published in June.

Secondly, Kuznietz raises doubt on whether our samples were totally homogenized. While we acknowledge that our note did not describe the samples at sufficient length, the fact is that our UC1-xNx samples were produced by reaction at 1,700°C for 4 hr in vacuum. The X-ray diffraction pattern of (331) and (420) peaks revealed that the UC1-xNx compounds with 0.1 ≤ x ≤ 0.9 evidently had only one phase (Fig. 1). Thus even conceding that a small amount of second phase could exist, it could only be U metal, and not U(C, N, O) or oxide as suggested by Kuznietz, on the ground that the transition temperature of U metal is 43°K(3). In actuality, the anomaly in magnetic susceptibility of U metal near 43°K is very small. These are the bases on which we judged the peaks to be due to U metal and discarded considerations on the possibility of a second phase. The nominal compositions were in near agreement with those determined by the usual X-ray method using Vegard's law, as seen in Fig. 2. There are many reports published on the lattice constants vs. composition relation for the UC1-xNx system. If we use the relation given by Leitnaker et al.(4)

\[ N/C + N = 1 - 12.6057(a-a_0) + 55.8264(a-a_0)^2 \\
+ 338.174(a-a_0)^3 - 10443.2(a-a_0)^4 A, \\
\]

\[ a_0 = 3.8892 \text{Å}, \]

the sample we have intended to be UC0.1N0.9 corresponds to x=0.905 and not x>0.95 as suggested by Kuznietz. The relation by Anselin(5) deviates the most from Vegard's law in the N rich region. If we use this relation, the sample we have intended to be UC0.1N0.9 corresponds to x=0.92. In either case, it is seen that the compositions determined by us for the samples are far from being as inferior as indicated by Kuznietz.

The singularity observed on the magnetic part of the dp/dT curve near the ordering temperature, where \( \rho \) is the specific electrical resistivity and \( T \) the temperature, is associated with the peculiar behavior. This makes it important to study dp/dT. Our recent

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Fig. 1 (311) and (420) peaks of X-ray diffraction for UC$_{1-x}$N$_x$, i.e. $x=0.9, 0.7, 0.5, 0.3$ and 0.1 measurements on UC$_{0.3}$N$_{0.7}$ show an anomaly in $d\theta/dT$ near 40°K.

No information is yet available on the neutron diffraction studies performed on the UC$_{1-x}$N$_x$ system at the Oak Ridge National Laboratory, nor on the characteristics of the samples used there.

The values of magnetic susceptibility of UN by de Novion & Costa(2) are not in agreement with those by other workers(6)(7) whereas ours(1) for UN agree well with them. What is more the $\alpha$ and $\gamma$ values for UN by de Novion & Costa in their calorimetric study(8) are not in agreement with those by Scarbrough et al.(8) These considerations would indicate that doubts might more justifiably be directed toward the samples used by de Novion & Costa(2).

**REFERENCES**