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COMPANY

CARBIDE AND CARBON CHEMICALS DIVISION
Union Carbide and Carbon Corporation

LOCATION

Post Office Box P
OAK RIDGE, TENN.

K-5000

TO
LOCATION

Dr. Frank W. Hurd
Building K-1004-A

DATE September 21, 1953

ANSWERING LETTER DATE

AECU-3240

SUBJECT Vapor Pressure-Temperature
Relations in the System
NaF-HF

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During 1946, F. D. Rosen, formerly at this laboratory, obtained vapor pressure data for the system sodium fluoride-hydrogen fluoride at a series of different temperatures. These data have never been issued in a formal report and have not been analyzed in detail. However, these data have been extremely useful in the preparation of pure, anhydrous hydrogen fluoride within the K-25 Laboratory Division, and have frequently been used in discussions with members of other divisions at K-25 and at Y-12. The principal use has been in specifying conditions under which hydrogen fluoride can be absorbed from a gas stream by sodium fluoride.

Original data, plotted in figure 1, cover the temperature range 14.6 to 207°C. and composition range $0 \leq (\text{moles HF})/(\text{moles NaF}) \leq 15$. Complex compounds, indicated by a constancy of pressure as the mole ratio (HF)/(NaF) increases, definitely include NaF·HF, NaF·2HF, and NaF·3HF. Two other complexes that probably correspond to the formulas NaF·3.5HF and NaF·5HF are also indicated. Compounds such as NaF·6HF and NaF·7HF possibly exist at the lower temperatures, although these are not unambiguously defined.

Variation of pressure of hydrogen fluoride over some of the complexes with temperature has been summarized in figure 2. Only the lines describing this variation have been shown; data used to obtain them were taken from figure 1.

Physical Chemistry Laboratory
Chemistry Department
Laboratory Division

Wallace Davis, Jr.
Wallace Davis, Jr.

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PRESSURE ISOTHERMS IN THE SYSTEM HF-NaF

FIGURE 1

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VAPOR PRESSURE OF NaF-HF COMPLEX COMPOUNDS

FIGURE 2

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