radiolysis, and low-temperature (250–260°) thermal decomposition are identical; FeC_2O_4 is missing among the principal final solid state products. Arguments are presented in favor of the view that the Fe(II)-containing final product of photodecomposition is a polymer of composition $(K_2[Fe(C_2O_4)_2])_n$. On the basis of the experimental and literature data, the flow sheet and stoichiometry of the photodecomposition has been determined. A comparison is made of the spectral dependences of photoconductivity and of photolysis in air. The type of charge carrier is established. Questions related to the mechanisms of photodecomposition are discussed.

Structure de l'Oxyfluorure de Tantale et de Sodium $Na_2Ta_2O_5F_2$ *β*. M. VLASSE, J. P. CHAMINADE, J. C. MASSIES, AND M. POUCHARD. Service de Chimie Minérale Structurale de l'Université de Bordeaux I, associé au CNRS, 351 cours de la Libération, 33405 Talence, France. The crystal structure of sodium tantalum oxyfluoride, β-$Na_2Ta_2O_5F$ has been determined from single crystal diffraction data. The symmetry is monoclinic, space group $C2/m$ with a cell having dimensions: $a = 12.855 \pm 0.008$, $b = 7.349 \pm 0.005$, $c = 12.833 \pm 0.003$ Å, $\beta = 108.97 \pm 0.05°$ and containing 8 formula units. The structure was refined by full-matrix least squares to a final R value of 0.072. The structure consists of 2 interpenetrating sublattices: the first, which has the overall formula $Ta_{16}X_{52}$, is made up of TaX_6 octahedra and the second with an overall formula $Na_{14}X_4$ is composed of Na_4X tetrahedra. The 2 remaining sodium atoms occupy the center of a hexagonal bipyramid. This arrangement can be described as a succession of weberite and pyrochlore type slabs parallel to the [001] direction.

Kinetics Studies of the Reactions of $KMnO_4$ *and of* KIO_4 *in Alkali Halide Disks*. H. S. KIMMEL, J. P. CUSUMANO AND D. G. LAMBERT. Department of Chemical Engineering and Chemistry, Newark College of Engineering, Newark, New Jersey 07102. The kinetics of the solid state reactions of $KMnO_4$ in alkali halide matrices and KIO_4 in alkali halide matrices were studied. All reactions were found to be first-order with respect to the species being reduced. Rate constants were determined at 25, 50, and 100°C, and activation energies were determined for the reactions of $KMnO_4$ in KI and KIO_4 in KI. At 25°C, the rate constants for the reaction of $KMnO_4$ in KI and $KMnO_4$ in RbI were approximately the same. But the rate constant at 25°C for the reaction of KIO_4 with I^- was about $2\frac{1}{2}$ times larger in a RbI disk than in a KI disk. Possible mechanisms for the solid state processes are suggested.

The Lanthanum Hydroxide Fluoride Carbonate System: The Preparation of Synthetic Bastnaesite. J. M. HASCHKE. Department of Chemistry, University of Michigan, Ann Arbor, Michigan 48104. Hydrothermal phase equilibria in the lanthanum + hydroxide + fluoride + carbonate system have been investigated along an isobaric and isothermal section of variable metal to fluoride ratio, x. Quantitative substitution of fluoride into $LaOHCO_3$ proceeds with the formation of a continuous solid solution, $La(OH)_{1-x}F_xCO_3$, for $o \leqslant x < 1$ and a two-phase region, $LaFCO_3 + LaF_3$, for $1 < x < 3$. Single crystal X-ray diffraction data show that untwinned $LaOHCO_3$ is an orthorhombic phase ($a = 21.891(5)$, $b = 12.639(3)$ and $c = 10.047(2)$ Å) which is not isostructural with $LaFCO_3$. Hydrolysis of the $La(OH)_{1-x}F_xCO_3$ phase to the corresponding UCl_3-type $La(OH)_{3-x}F_x$ compositions has been observed. Thermal decomposition reactions of the hydroxide fluoride carbonates are described, and a geochemical process for the formation of bastnaesite and tysonite is proposed.

Stability of Two Cobalt Titanate Defect Spinels. J. P. SHARPLES AND A. NAVROTSKY. Department of Chemistry, Arizona State University, Tempe, Arizona 85281. Preparation of the defect spinels $Ti_3\square Co_2O_8$ and $Ti_4\square Co_4O_{12}$ was attempted by solid state exchange reactions. $Ti_4\square Co_4O_{12}$ was successfully synthesized but attempts at preparing pure $Ti_3\square Co_2O_8$ were unsuccessful. The enthalpy of transformation of $\frac{1}{4}$ $Ti_4\square Co_4O_{12}$ to $CoTiO_3$ (ilmenite) was determined by calorimetry, $\Delta H^\circ_{298} = -1.7 \pm 1.0$ kcal/mole.

Etude Cristallographique et Magnetique de la Solution Solide $Fe_{2-2x}Ni_{1+x}Sn_xO_4$. C. DJEGA-MARIADASSOU, F. BASILE, AND P. POIX. E. R. 83 du C.N.R.S. Université de Paris XI, Laboratoire de Chimie minérale, Batiment 420, Centre Scientifique d'Orsay, 91405 Orsay, France. Crystallographic and magnetic measurements made on $Fe_{1-x}Ni_{1-x}Sn_xO_4$ ferrites indicate a large proportion of the Fe^{3+} ions are on A sites but do not specify what are the respective amounts of Ni^{2+} and Sn^{4+} on the A sites. Ni^{2+} concentration on B sites cannot be greater than 1.26 and thus the rate of substitution is limited by $x = 0.37$. As shown by the values of α and β determined from magnetic measurements, the magnetization