The Nature of Garnierites—III Thermal Transformations

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Abstract: Serpentine- and talc-like garnierites described in Parts I and II were heated at various temperatures up to about 1000 ° C and after each treatment were cooled and examined by X-ray powder diffraction. The serpentine-like garnierites at about 550 ° C the temperature at which rapid dehydroxylation begins, formed a highly disordered phase. When the NiO content was low (approximately < 20 wt%), the disordered phase transformed directly to an olivine phase around 800 ° C but when the NiO content was higher, various transitional phases were formed before an olivine phase appeared around 1000 ° C A sepiolite-like phase was obtained with one sample around 800 ° C and several samples showed face-centered cubic modifications between 900 and 1000 ° C.

The talc-like garnierites with low NiO content formed an enstatite phase around 800 ° C directly following the dehydroxylation reaction, but with high NiO contents an olivine phase became increasingly prominent between 850 and 1000 ° C. Identification of the mixed crystallizations possibly existing in the initial minerals is scarcely feasible on the basis of the products formed up to 1000 ° C.

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