Molodoy Shiveluch is the northernmost and one of the most active Kamchatka volcanoes. It is characterized by intense explosions, development of extrusive domes and long-term gas release. Major event of each eruptive cycle is a hazardous explosive eruption with massive (up to 1.5-2 km$^3$) ejection of juvenile pyroclastics. Igneous rocks are composed of corniferous andesites. Quiet inter-eruptive period of Molodoy Shiveluch, after the hazardous eruption of November 1964 that lasted till the dome formation in 1980, was characterized by fumarole-solfatara activity. Fumarole sediments and thermal grounds showed over 30 newly formed minerals referring to six classes of chemical compounds. Those are elements, carbides, sulfides, oxides and hydroxides, chlorides and sulfates, the latter predominating by the variety of minerals. Mineralization near gas vents is peculiar for the formation of iron sulfides FeS$_2$ and sassolite B(OH)$_3$, while native sulfur S is widespread and forms thick incrustations. Distinguishing are findings of moissanite SiC, whose genesis (fumarolic, hydrothermal, cosmogenous, anthropogenic) has not been unambiguously determined yet. Period of long-term gas emission is peculiar for the deep alteration (argillization, opalization, alunitization) of rocks in the near-crater zone. Following methods were applied: chemical analysis, polycrystals’ radiography, differential-thermal analysis. Studies of modern volcanogenic metamorphism present certain interest, since they might form the basis for confident judgments on the genesis of this process in the areas of paleovolcanoes, on association of active volcanism and hydrothermal alteration of rocks in terms of space and time, and the determining role of a common deep source in their specification.