K-RICH PHASE IN NIHO-3(MIYANO) H3 CHONDRITE;

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The Niho-3(Miyano) meteorite of 19.18 grams fell in Miyano, Yamaguchi-shi, Yamaguchi-ken Japan (34°12'N, 131°34'E) on August 8, 1897. The meteorite is considered to be the same fragment with the Niho-1 and -2 (H3) chondrites discovered at a distance 6.2 km north-east away. The ellipsoidal dark-gray meteorite was originally 3x2x1.5cm (density 3.59 gr/cm^3). Electron microprobe analyses of 165,600 analyzed points by the JCMA-733 yield the bulk composition of the meteorite as follows in weight percent: SiO_2 35.57, Al_2O_3 2.54, Cr_2O_3 0.59, FeO 22.04, MnO 0.39, MgO 21.23, CaO 2.31, Na_2O 0.95, K_2O 0.08, NiO 0.23 and BaO 0.04. Modal mineral contents (in volume percent) are orthopyroxene 32, clinopyroxene 24, olivine 24, plagioclase(-like) 8, metal phases 9.0 and K-rich phase 1.0. The meteorite contains numerous glassy and crystalline chondrule (up to 2.2x1.2 mm in size). Various sizes of orthopyroxenes of inhomogeneous composition ($En_{83-87}Fs_{10-16}Wo_{0-5}$) show microporphyric chondrules. The large pyroxene chondrule (2.2x1.2mm) consists of orthopyroxene ($En_{85}Fs_{14}$) at the rim and clinopyroxene (Wo_{46} En_{46}) in the core. Olivine occurs in the microporphyric chondrules and has inhomogeneous composition ($Fo_{82-99}Fa_{1-18}$). The metal phases consist of kamacite(86 vol.%), plessite(11 vol.%) and taenite(3 vol.%). The fine-grained plagioclase(-like) grains consist of glassy (maskelynite, $An_{17-19}Or_{2-3}$) and clear crystal of An_{11} Or_{13} (40x30μm in size). The latter plagioclase(-like) crystal grains are enriched with Mg, K and Fe, but deficient in Al, Na and Ca;that is, plausible chemical formula is $(Na_{0.6}K_{0.1}Ca_{0.1}$ $Mg_{0.1}Fe_{0.1})(Al_{0.8}Si_{2.9}$ $Mg_{0.3})O_8$. K-rich phase is irregularly distributed in the matrix, and shows composition of $Or_{33}An_{40}$, but enriched with Mg and Fe (Table 1).

Frequency distribution of iron contents of olivine and orthopyroxene, and textural characteristics suggest that the Niho-3 meteorite belongs to the H-group and petrologic type 3 of Dodd(1981) classification [1]. It is confirmed that the Niho-3 meteorite is the same type and group with the Niho-2 (H3) reported by Shima et al. (1984)[2].

The Niho meteorites might be differentiated fragments within the IIE parent body at the primordial stage by the following reasons: (1) The K-rich phase of alkali-feldspar has been discovered in type IIE iron meteorite and Naklites (but not in chondrites) so far. (2) Oxygen-isotope data for the group IIE silicate inclusions suggest that they are related to H-group chondrites[3]. (3) The Niho-2 chondrite shows gas-rich of ^4He and trapped Ne, and age of 4.51 b.y.(by ^{40}Ar dating)[2]. (4) The values of Mg/(Fe+Mg) in the Niho-3 are almost the same in orthopyroxenes(0.85), olivine (0.85), plagioclase(-like) grains (0.81) and K-rich phase(0.80) (cf. Table 1).

If there is the different parts of the Niho parent body, it is exceedingly valuable to explain the anomalous compositions of

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K-rich phase and plagioclase(-like) grain in the Niho-3 chondrite. The Kuga iron meteorite might be the different fragments from the Niho parent body.

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Table 1. Chemical compositions of representative K-rich phase and plagioclase(-like) grain in the Niho-3(Miyano) H3 chondrite.

	K-rich phase			plagioclase(-like) grain		
	(wt.%)	(Cations per 80)		(wt.%)	(Cations per 80)	
SiO_2	64.26	Si	2.93	65.24	Si	2.91
TiO_2	0.37	Ti	0.01	0.65	Ti	0.02
Al_2O_3	11.91	Al	0.64	15.03	Al	0.79
Cr_2O_3	0.48	Cr	0.02	0.20	Cr	0.01
FeO*	3.09	Fe	0.12	2.56	Fe	0.10
MnO_2	0.55	Mn	0.02	0.10	Mn	0.00
MgO	7.00	Mg	0.48	6.52	Mg	0.43
BaO	0.00	Ba	0.00	0.01	Ba	0.00
CaO	6.14	Ca	0.30	1.77	Ca	0.08
Na_2O	2.25	Na	0.20	6.67	Na	0.58
K_2O	4.28	K	0.25	1.78	K	0.10
Total	100.33		4.97	100.53		5.02
Or(mol %)	33.3			13.3		
Ab(mol %)	26.6			75.7		
An(mol %)	40.1			11.0		
Mg/(Fe+Mg)	0.80			0.81		

* Total iron oxide as FeO.