大本 洋*：K-A 法による飛騨変成岩の角閃石の年令決定

飛騨変成岩の絶対年令については、すでに、片麻岩の雲母類を、K-A 法により測定し、170 m. y.～210 m. y. の結果が報告されている（KUNO, H., et al., 1960, 齊藤信也他, 1961）。

筆者は、齊藤正雄教授の御指導のもとに、若千の岩石について、K-A 法による年令決定を行いつつあるが、ここに、飛騨変成岩についての結果を略報しておく。

試料として、小林英夫・太田昌幸博士によって採集された、縦状角閃片麻岩から分離した、角閃石をあつかった。アルゴン抽出、質量分析など、一連の実験は、東北大学岩石鉱物鉱床学教室において、河野義礼教授、植田良夫、青木朝一郎、大貫仁博士の御指導を受けて行なった。

試料岩石の採集地点、および、各試料の年令は図に示した通りである。図からも明らかに知る如く、200 m. y. 前後の年令を示すもの——II. (190±15) m. y., III. (210±15) m. y.—と、それよりも古い年令を示すもの——I. (325±25) m. y., IV. (285±25) m. y., V. (345±30) m. y.—の存在が認められる。試料及、及び、実験の詳細は、別に報告するつもりである。

飛騨変成帯のように、複雑な変成史を有する変成帯の岩石の年令決定には、雲母類の K-A 年令のみでは、不充分であって、種々の鉱物について、K-A 法、Rb-Sr 法、U-Pb 法などを併用して測定されることが必要である。また、熱的条件に対する、アルゴンの逸散などの問題を考えると、K-A 法を採用するとしても、雲母類よりも、角閃石類の方が、試料として、より適当であるように思われる。

実験の機会を与え、親切に指導してくださった、河野義礼教授はじめ、東北大学岩石学教室の方々、さらには、終始、あたたかく、指導、励まししてくださった、北大、齊藤正雄、八木健三教授、小林英夫、太田昌幸博士、その他の方々に、心からの感謝の意を表する。

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* 北海道大学理学部地質鉱物学教室
地質学雑誌 第 20 巻 第 824 号 1964 年 6 月

KAZUO HARADA**：Mineralogical notes on the alteration product of liparite, Konoki,
Mihama-machi, Mie Prefecture

In the area near Kumano City, Mie Prefecture, granite-porphyry and various kinds of liparites occur dominantly covering sedimentary rocks of Miocene age (Miyai Series) and of unknown geological age (Shimanto Group). The liparite lava was grouped into three according
GEOLOGICAL MAP NEAR KUMANO CITY

LEGEND
- Granite porphyry
- Persemic liparite
- Agglomerate
- Hyalo-liparite
- Felsic liparite
- Miyai Series (Tertiary)
- Unknown Mesozoics

Fig. 1

Loc. 1. Altered liparite and micaclay mineral used chemical analysis.
Loc. 2. Partially altered liparite used chemical analysis.
Loc. 3. Fresh hyalo-liparite used chemical analysis.

To the nature of phenocrysts as (a) persemic liparite (b) hyalo-liparite, and (c) felsic liparite from lower to upward. Among them, hyalo-liparite has usually been altered intensely along small faults, whereas the other two are fresh free from alteration even in the area of faults. This report provides mineralogical notes on alteration of hyalo-liparite, Konoki, Mihama-machi, Mie prefecture. Geological distribution and sampling localities are shown in Fig. 1.

Microscopic observation revealed that hyalo-liparite free from alteration is largely composed of glass particles without alteration, which, however, have altered to fine micaeous mineral in altered part. In Table 1, the chemical composition of hyalo-liparite free from impurities (1) is compared with those of partially altered part (2) and intensely altered part (3).

Along with progress of alteration the following trends are noticed; increase of SiO₂ and water, and decrease of bases.

The altered liparite was crushed and particle sizes of phenocrysts were estimated to be about 60 mesh in maximum and the fraction less than two microns (e.n.s.) was accumulated by the sedimentation method. The fraction thus obtained was completely dried up at room temperature and investigated by X-ray. The fraction less than two microns was separated from three samples (A, B, and C). The chemical composition of specimen(A) is as shown in Table 1(4). X-ray powder diffraction data (Table 2) revealed that quartz and plagioclase particles are still included in this fraction among with illite; its 10 Å reflection was obtained to be slightly larger in (A) and (B) than in (C). These samples
Table 1. Chemical analyses of hyalo-liparite and the concentrate of its alteration product (wt%)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>72.02</td>
<td>75.58</td>
<td>83.50</td>
<td>51.55</td>
</tr>
<tr>
<td>TiO₂</td>
<td>0.02</td>
<td>0.04</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>14.65</td>
<td>14.30</td>
<td>9.56</td>
<td>31.53</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>0.63</td>
<td>0.66</td>
<td>0.62</td>
<td>0.96</td>
</tr>
<tr>
<td>MnO</td>
<td>—</td>
<td>—</td>
<td>trace</td>
<td>—</td>
</tr>
<tr>
<td>MgO</td>
<td>0.65</td>
<td>0.12</td>
<td>0.31</td>
<td>1.08</td>
</tr>
<tr>
<td>CaO</td>
<td>1.65</td>
<td>0.50</td>
<td>0.10</td>
<td>0.79</td>
</tr>
<tr>
<td>Na₂O</td>
<td>3.80</td>
<td>4.15</td>
<td>0.60</td>
<td>0.31</td>
</tr>
<tr>
<td>K₂O</td>
<td>4.00</td>
<td>2.90</td>
<td>2.50</td>
<td>4.15</td>
</tr>
<tr>
<td>H₂O (–)</td>
<td>0.21</td>
<td>0.31</td>
<td>—</td>
<td>3.90</td>
</tr>
<tr>
<td>Ig. loss</td>
<td>0.91</td>
<td>1.31</td>
<td>3.10</td>
<td>5.56</td>
</tr>
<tr>
<td>(&gt;105°C)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>n.d.</td>
</tr>
<tr>
<td>Total:—</td>
<td>99.41</td>
<td>99.98</td>
<td>100.29</td>
<td>99.84</td>
</tr>
</tbody>
</table>

1) Hyalo-liparite fresh free from alteration
   (analyst: H. Shibata)
2) Partially altered part (analyst: H. Shibata)
3) Intensely altered part (analyst: H. Shibata)
4) Concentrate of the alteration product in the fraction less than two microns (e. n. s) (analyst: K. Harada) specimen (A)

Table 2. X-ray powder diffraction data* for the concentrate of the alteration product in the fraction less than two microns (Cu Kα: 1.5418 Å)

<table>
<thead>
<tr>
<th></th>
<th>(A)</th>
<th>(B)</th>
<th>(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d (Å)</td>
<td>I</td>
<td>d(Å)</td>
<td>I</td>
</tr>
<tr>
<td>10.5±0.1</td>
<td>100</td>
<td>10.8±0.1</td>
<td>33</td>
</tr>
<tr>
<td>4.98</td>
<td>41</td>
<td>5.09</td>
<td>11</td>
</tr>
<tr>
<td>4.25</td>
<td>11</td>
<td>3.33**</td>
<td>100</td>
</tr>
<tr>
<td>3.78</td>
<td>11</td>
<td>3.23***</td>
<td>28</td>
</tr>
<tr>
<td>3.34</td>
<td>72</td>
<td>1.99</td>
<td>8</td>
</tr>
<tr>
<td>3.00</td>
<td>6</td>
<td>3.23***</td>
<td>32</td>
</tr>
<tr>
<td>2.51</td>
<td>6</td>
<td>1.99</td>
<td>10</td>
</tr>
<tr>
<td>1.99</td>
<td>11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Quartz** and plagioclase*** are still contained in this fraction.

were heated at every temperature as 300°C, 400°C and 650°C for an hour and investigated by X-ray immediately after cooling under the same experimental condition. Furthermore these samples were treated with ethylene glycol and ammonium nitrate solution (1 N boiling for ten minutes). The spacings of 10.8 Å-10.5 Å clearly decrease and approach to the spacing of usual illite by heating (Table 3), and slightly shift toward the lower glancing angle side by treat-
Table 3. X-ray powder diffraction data of heated specimens (A) and (B) (Cu Kr: 1.5418 Å)

<table>
<thead>
<tr>
<th></th>
<th>300°C</th>
<th></th>
<th>400°C</th>
<th></th>
<th>650°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) d (Å)</td>
<td>I</td>
<td>(B) d (Å)</td>
<td>I</td>
<td>(A) d (Å)</td>
</tr>
<tr>
<td>10.3±0.1</td>
<td>100</td>
<td>10.2±0.1</td>
<td>70</td>
<td>10.2±0.1</td>
<td>93</td>
</tr>
<tr>
<td>5.04</td>
<td>48</td>
<td>5.01</td>
<td>29</td>
<td>5.06</td>
<td>10</td>
</tr>
<tr>
<td>3.33</td>
<td>100</td>
<td>3.33</td>
<td>100</td>
<td>3.33</td>
<td>100</td>
</tr>
<tr>
<td>1.99</td>
<td>30</td>
<td>3.23</td>
<td>28</td>
<td>3.23</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ment with ethylene glycol, and shifts slightly toward the higher angle side by treatment with ammonium nitrate solution.

The alteration product was identified to be illite, some of which are slightly hydrated; that is usual illite layers are interstratified with a small number of more hydrated layers randomly.

The writer is greatly indebted to professor T. Sudo for leading this study and to professor H. Shibata for the chemical analysis.

Reference


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