

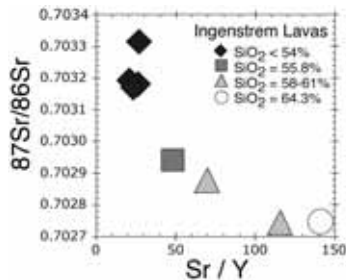
## Western Aleutian and Kamchatka high-Mg# Andesite and Dacite

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Recent mapping has identified an active field of high-Mg# andesite/dacite volcanism on the western Aleutian seafloor in the area of the Ingenstrem Depression, a rectangular basin that lies on the Aleutian Ridge crest west of Buldir island, the western-most emergent volcano in the arc. Ingenstrem lavas include a large proportion of primitive samples ( $Mg\# > 0.60$ ) which span the basalt-dacite compositional range (50-67%  $SiO_2$ ). Basalts have moderately enriched trace element patterns ( $La/Yb=4-8$ ,  $Sr/Y < 30$ ) and relatively radiogenic Sr compared to MORB ( $^{87/86}Sr=0.7031-0.7033$ ). In contrast, high-Mg# andesites and dacites have high Sr (700-2300 ppm) and fractionated trace element patterns ( $Sr/Y > 50$ ), with low Y (<12 ppm) and HREE's. Samples with high Sr/Y also have systematically higher  $SiO_2$ , Mg#, Cr and Ni. Ingenstrem lavas of all compositions have Sr isotopes that are inversely correlated with Sr/Y and  $SiO_2$ , so the most felsic samples (66-67%  $SiO_2$ ) have the most fractionated trace element patterns ( $Sr/Y > 120$ ) and the least radiogenic Sr ( $^{87/86}Sr < 0.7028$ ; see figure). Pb isotopes indicate that the Ingenstrem lavas contain little subducted sediment ( $^{206/204}Pb=18.41-18.56$ ), but the narrow range for Nd isotopes ( $\epsilon Nd=8.5-9.5$  with  $^{87/86}Sr=0.7027-0.7033$ ) suggests that there may be an important source component for these rocks in seawater-altered oceanic crust. Ingenstrem andesites and dacites are crystal-rich, with phenocrysts of plagioclase, pyroxene and amphibole. In this way they contrast primitive andesites from the Shisheisky Complex, a field of monogenetic cones north of Shiveluch Volcano in Kamchatka [1], which have higher MgO (~8%), are aphyric or olivine phyric and lack phenocrysts of plagioclase.



Textural, mineralogical and major element differences between these primitive andesite suites probably reflect a key role for pre-eruptive volatile loss, which drove late crystallization to produce the phenocryst-rich textures and slightly fractionated compositions of the Ingenstrem compared to Shisheisky lavas.

[1] Portnyagin *et al.* (2007) *Geophysical Monograph* **172**.

## Geochemistry of coordination space on the surface of manganese dioxide covered with hydroxyl groups

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### Introduction

Manganese crust consisting of manganese dioxide ( $MnO_2$ ) in marine environment concentrates platinum (Pt), that is, the Pt content of manganese crust is higher compared with that in Earth crust. On the other hand, the gold (Au) content of manganese crust is lower than that in Earth crust. This different behavior for Pt and Au is one of the most attracted problems in geochemistry. The contents of Pt and Au are considered to be controlled by adsorption on  $MnO_2$ . In this study, therefore, adsorption behavior of Pt(II) and Au(III) complex ions on  $MnO_2$  was investigated in order to elucidate the difference in geochemical behavior of Pt and Au in marine environment.

### Results and Discussion

#### Behavior of Pt(II)

In the pH range 4 – 6, the amount of Pt(II) adsorbed on  $MnO_2$  increased with increasing pH and the amount attained a constant value above pH 6. As the PZC (point of zero charge) of  $MnO_2$  is around pH 4, Pt(II) was considered to be adsorbed by the specific adsorption. From XPS spectra for Pt adsorbed on  $MnO_2$  and its EXAFS analysis, the adsorbed 4-coordinated Pt(II) with square plane structure was oxidized to 6-coordinated Pt(IV) with octahedral structure by Mn(IV) in  $MnO_2$ . The coordinated atoms for the Pt(IV) were all oxygen atoms, indicating that the Pt(IV) was substituted to Mn(IV) in  $MnO_2$  by isomorphous substitution. The concentration of Pt in manganese crust is concluded to be caused by the oxidative substitution

#### Behavior of Au(III)

In the pH range 4 – 6, the amount of Au(III) adsorbed on  $MnO_2$  increased with increasing pH and the maximum amount appeared at pH 6. Au(III) was also adsorbed by specific adsorption. However, a part of Au(III) adsorbed was reduced to atomic gold, Au(0), even in the absence of specific reducing reagents. The Au(0) is probably desorbed from the surface of  $MnO_2$ . Accordingly, concentration of Au into manganese crust hardly occur.