**Coronitic Troctolite of Probable Jurassic Age, North Carolina Piedmont**

**Abstract**

An unusual spinel-bearing troctolite occurs in a single outcrop located along Smith Creek in southern Granville County, North Carolina. It lies on the trace of the Jonesboro fault, a major west-dipping normal fault that constitutes the eastern border of the Durham sub-basin of the Deep River Triassic basin in this area.

 Petrographic examination shows that phenocrysts of olivine to 0.5 cm in diameter are surrounded by calcic plagioclase in a likely cumulate texture. Mineral analyses and imaging (done at the UNC-CH lab) reveal discontinuous corona reaction zones between the olivine and plagioclase. These zones consist of varying proportions of orthopyroxene, paragonite, amphibole, and possible sparse clinozoisite, as well as green diopside, which occurs in symplectic intergrowths.

Although the rock has not been dated, it may represent a cumulative fraction related to the Jurassic-age olivine diabase dike common in the area. The mineral content and chemistry, the impelled bulk composition, and the lack of greenstained amphiboles suggest metamorphism occurred at peak conditions for this conclusion. The reactants likely occurred at near-solidus conditions.

### Table 1: Selected Mineral Analyses

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Ca</th>
<th>Mn</th>
<th>Al2O3</th>
<th>Mg</th>
<th>Si</th>
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</thead>
<tbody>
<tr>
<td>Olivine</td>
<td>0.94</td>
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<td>0.45</td>
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<td>1.0</td>
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<td>Plagioclase</td>
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<td>0.3</td>
<td>0.85</td>
<td>2.5</td>
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<tr>
<td>Orthopyroxene</td>
<td>0.85</td>
<td>1.2</td>
<td>0.75</td>
<td>2.2</td>
<td>1.1</td>
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<tr>
<td>Amphibole</td>
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<td>0.5</td>
<td>0.80</td>
<td>2.0</td>
<td>0.7</td>
</tr>
</tbody>
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### References