## **Fast Preview**

Note: This is not exactly what the published abstract will look like

Dimitrios Xirouchakis       1-2 (281-483-5305; dxirouch@ems.jsc.nasa.gov) <sup>1</sup> Astromaterials Research and Exploration Science, NASA JSC SA 13, Houston, TX 77058, United States       Reference Number: 72 <sup>2</sup> Department of Chemistry, Texas Southern University, 3100 Cleburne Ave, Houston, TX 77054, United States       Imitrios Xirouchakis         Crhorhombic, (Bhum), (AI, Fe, Cr, TDS, (2) STIOS, (5)-Mg, Fe/TiS (2) OS (5) Solid solutions phase in igneous and netamorphic rocks on Farth (e.g., basalt flows, crustal and mante xenoliths immediates and scalability and the Moon. Moreover, orthorhombic coides are order part of the crystalline matrix in glassic cramies with useful applications, and play a major role in the industrial production of TiOS, (2) S. To faily exploit the potential of these compounds as petrogenetic indicators in prosente instity phase equilibrium, and its tait V-1-ration disorder on solid in state V-1-ration disorder on SOS (5) (5) Katter matrix in glassic eramise with useful applications, include sate is that for MgTS (2) SOS (3) S, dister matrix is and subility, and the phase relations in the Glubs free energy of the MgTS (2) SOS (3) S, dister minaris and the achiever in the rotic Glubs free energy of the MgTS (2) SOS (3) S, dister matrix is disconted in of rodes that providus treated relations in the MgTS (2) SOS (3) S, other transition processes in pressure have the opposite effect. Although, currently, the potential effect of composition suggest that pseudobrookite septorokites is probably controled by controled with allow energy or the MgTS (2) SOS (2) S, other cannob fall, well sequest that endicide and matter xenoliths, such reactions in the SIOS (2) Service matrix on the searchine Clavelate the stability of (A), Fe, Cr, T) rich metric and or runtile. The searchine and the SIOS (2) Servichied mstris in constration of these consequendly, the	Stability of Pseudobrookite-type Titanium Oxides	Meeting: 2002 Spring Meeting
<ul> <li><sup>1</sup> Astromaterials Research and Exploration Science, NASA JSC SA 13, Houston, TX 77058, United States</li> <li><sup>1</sup> Oppartment of Chemistry, Texas Southern University, 3100 Cleburne Ave., Houston, TX 77004, United States</li> <li><sup>1</sup> Orhorhombic, (Bhrmn), (AI, Fe, Cr, Ti)5, (2)STIOS, (5)-(Mg, Fe)Ti5, (2)OS, (5) Stold solutions (pseudobrookites, s1.) are found either as an oxidation product of limenite or a primary crystallize materials we need to quantitatively understand the factors control ling their propresence indicators and/or useful materials we need to quantitatively understand the factors controlling their propresence indicators and/or useful materials we need to quantitatively understand the factors controlling their propresence indicators and/or useful moles the aphrose relations. For that purpose, we need to combine thermoethemistry, phase equilibrium, and in situ P-V-raction disorder experimental data that presently either are incomplete or lacking. Perhaps, the most complete data set is that for MgTi5, (2) SOS, (5) Karouchakis Consequently, the effect of cation disorder contonel ordendral sites. Consequently, the effect of cation disorder cannot be fully explored, it appears that errichment in trivalent cations probably endired mante scoling and thus entropy-stabilization in cortast, isothermal increases in temperature favor disordering and thus entropy. Iso 2, (2) Se-mriched mel/fluid to form orbitos or limenite. In earthy scolar and matte xnolitik, the presence or absence of avera indicators may be of orbitoriomite, in contrast, cooling at low pressures seems to orbit se of restant and mante xenolity, and the factors control in the indice scolar society of America increases in temperature favor disordering and thus entropy. The appears that eracine manter scolar distribution of models calculated has set is that from MgTiS (2) SOS (5) Karouchakis</li> <li>Metring Exercise 1</li> <li>Metring Exercise 1</li> <li>Metring Exercise 1</li> <li>Metring Exercise 1</li></ul>	Dimitrios Xirouchakis <sup>1,2</sup> (281-483-5305; dxirouch@ems.jsc.nasa.gov)	Reference Number: 72
Orthorhombic, (Bbmm), (AI, Fe, Cr, Ti)S_{2}STiOS_{5}-(Mg, Fe)TiS_{2}OS_{5}S solid solutions (pseudobrookites, s.l.) are found either as an oxidation product of ilmenite or a primary crystallic among version (pseudobrookites, s.l.) are found either as an oxidation product of ilmenite or a primary crystallic among version (pseudobrookites, s.l.) are found either as an oxidation product of ilmenite or a primary crystallic among version (pseudobrookites, s.l.) are found either as an oxidation product of the distribution production of TiOS_{2}S. To fully exploit the potential of these compounds as petrogenetic indicators and or useful materials we need to quantitatively understand the factors controlling their properties of and stability, and thus, to extrapolate beyond the calibrating experiments. For that puppose, we need combine thermochemistry, phase equilibrium, and in situ P-V-T-cation disorder experimental data is this for Mg TiS_{2} SOS_{5}S(S) (s.l) (s.tiotikity, and the phase relations anto the MgS^2(-2) STIS (+4) S distribution between the two nonequivalent octahedral sites. Consequently, the effect of cation disorder on Mg TiS_{2}S(S) (S) (S) (S) (S) (S) (S) (S) (S) (S)	<sup>1</sup> Astromaterials Research and Exploration Science, NASA JSC SA 13, Houston, TX 77058, United States <sup>2</sup> Department of Chemistry, Texas Southern University, 3100 Cleburne Ave., Houston, TX 77004, United States	Membership Number: Dimitrios Xirouchakis AGU - 30001087
Scheduling request:	Orthorhombic, (Bbmm), (AI, Fe, Cr, Ti)\$_{2}STiO\$_{5}-(Mg, Fe)Ti\$_{2}O\$_{5}S olid solutions (pseudobrookites, s.l.) are found either as an oxidation product of ilmenite or a primary crystallizing phase in igneous and metamorphic rocks on Earth (e.g., basalt flows, crustal and mantle xenoliths, hornfels), and basaltic rocks on the Moon. Moreover, orthorhombic oxides are often part of the crystalline matrix in glass/ceramics with useful applications, and play a major role in the industrial production of TiOS_{2}S. To fully exploit the potential of these compounds as petrogenetic indicators and/or useful materials we need to quantitatively understand the factors controlling their properties and stability, and thus, to extrapolate beyond the calibrating experiments. For that purpose, we need to combine thermochemistry, phase equilibrium, and in situ P-V-T-cation disorder experimental data that presently either are incomplete or lacking. Perhaps, the most complete data set is that for MgTiS_ {2}SOS_{5}S (karrooite) which allows the calibration of models for the Gibbs free energy of the MgTiS_ {2}SOS_{5}S as a function of pressure, temperature, and the MgS^{2+}S-TiS^{4+}S distribution between the two nonequivalent octahedral sites. Consequently, the effect of cation disorder on MgTiS_{2}SOS_{5}S stability, and the phase relations among MgTiS_{2}SOS_{5}S, other titanium oxides, and silicate minerals can be examined. Calculated phase relations in the Mg-Ti-Si-O system and phase equilibrium experiments in Fe-bearing compositions suggest that pseudobrookite-type oxides may be a more common in rocks than previously realized. However, homogeneous and heterogeneous equilibria, and crystallization paths likely affect their stability. For example, isobaric increases in temperature favor disordering and thus entropy-stabilization, in contrast, isothermal increases in pressure have the opposite effect. Although, currently, the potential effect of composition to cation disorder cannot be fully explored, it appears that enrichment	Contact Information: Dimitrios Xirouchakis Astromaterials Research and Exploration Science NASA JSC SA 13 Houston, TX 77058, United States ph : 281-483-5305 fax : e-mail : dxirouch@ems.jsc.nasa.gov Student rate: Not Applicable Willing to chair a session: Dimitrios Xirouchakis Meeting Section: M - Mineralogical Society of America Special Session: M00 - General Contributions Index Terms: 3620,3630,3672,3919,3939 Theme: Material presented: 0% Contributed Poster presentation requested: Poster Request
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