

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Analytical Construction of A Dense Packing of Truncated Tetrahedra and Its Melting Properties YANG JIAO, SALVATORE TORQUATO, Princeton University — Dense polyhedron packings are useful models of a variety of condensed matter and biological systems and have intrigued scientists and mathematicians for centuries. Here, we analytically construct the densest known packing of truncated tetrahedra with a remarkably high packing fraction $207/208=0.995192$, which is amazingly close to unity and strongly implies its optimality. This construction is based on a generalized organizing principle for polyhedra that lack central symmetry that we introduce here. The packing characteristics and equilibrium melting properties of the putative optimal packing as the system undergoes decompression are discussed.

Yang Jiao
Research Associate

Date submitted: 04 Nov 2011

Electronic form version 1.4