

SINGLE CRYSTAL GROWTH AND STUDY OF MAGNETIC PROPERTIES OF  
THE ONE DIMENSIONAL SYSTEMS  $\text{BaCu}_2\text{V}_2\text{O}_8$  AND  $\text{Ba}(\text{Cu}_{1-x}\text{Zn}_x)_2\text{V}_2\text{O}_8$

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ABSTRACT

Polycrystalline samples of the quasi-one-dimensional, spin 1/2 chain compound  $\text{BaCu}_2\text{V}_2\text{O}_8$  and the zinc doped  $\text{Ba}(\text{Cu}_{1-x}\text{Zn}_x)_2\text{V}_2\text{O}_8$  ( $x = 0.05, 0.1, 0.15, 0.2, 0.3$  and  $0.4$ ), were synthesized using the solid state reaction method. Small size single crystals ( $\sim 1.5\text{mm}^3$ ) were grown using the vertical Bridgman-Stockbarger method and the slow cooling method. Crystal structure and magnetic properties were characterized using powder x-ray diffraction and superconducting Quantum Interference Device (SQUID), respectively. Magnetic susceptibility measurements on the polycrystalline samples suggested that the magnetic behavior of this compound was best described by an isolated dimer model. The effect of substituting zinc for copper on the spin gap ( $\Delta$ ) showed that  $\Delta$  was weakly dependent on  $x$ , which confirmed that the isolated dimer model was valid in order to explain the origin of the spin gap in this system.

KEY WORDS:  $\text{BaCu}_2\text{V}_2\text{O}_8$ / CRYSTAL GROWTH / SPIN GAP /  
ONE DIMENSIONAL / SPIN 1/2 CHAIN

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