

Abstract Submitted
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Insights into the Electronic Structure of Single-Crystal AlN with NRIXS JOSEPH BRADLEY, GERALD SEIDLER, University of Washington, RAFAEL DALMAU, North Carolina State University, KENNETH NAGLE, University of Washington, ZLATKO SITAR, North Carolina State University — A fundamental description of the mechanisms underlying the diverse applications of w-AlN requires a complete understanding of its short-range and long-range electronic structure. Here, we report momentum-transfer (q) dependent nonresonant inelastic x-ray scattering (NRIXS) measurements of single crystal w-AlN, surveying the low-energy plasmon regime, as well as the complex behavior at the Al K and L edges. This complete determination of the dynamic structure factor $S(q,w)$ over a wide range of q and w both within and perpendicular to the basal plane allows for a uniquely detailed perspective on chemical bonding and low-energy electronic response in w-AlN. Our results are compared and contrasted with two independent ab initio theoretical treatments.

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