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Selenium Derivatization of Nucleic Acids and MAD Phasing for Structure Determination. Z. Huang,¹ J. Jiang,² N. Carrasco,¹ ¹Chemistry Dept., Brooklyn College, Programs of Chem. & Biochem., CUNY Graduate School, Brooklyn, NY 11210, ²Biology Dept., Brookhaven National Laboratory, Upton, NY 11973.

Nucleic acid derivatization for phasing is a long-standing challenge in X-ray crystallography. We have recently demonstrated a novel derivatization strategy via Se replacement of nucleotide O (ref. 1-3). Unlike conventional Br derivatization on the 5-position of deoxyuridine for nucleic acid MAD phasing, Se can be selectively introduced to a variety of positions via O replacement. In addition, Br derivatives are light sensitive, and long-time exposure to X-ray (ref. 4) may cause decomposition. Therefore, Se should be a significantly better alternative to the Br derivatization. We will present two crystal structures of the Se-derivatized oligonucleotides, and compare X-ray radiation stability of Se and Br derivatization and radiation damage that effects MAD phasing.

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