

The objective of this PRF project has been to study the basic physical and chemical properties of hypothiocyanite (OSCN⁻). These studies are expected to promote a better understanding of OSCN⁻ as a human defense factor. Amongst the notable scientific accomplishments of PRF 42850-AC4: 1. we have developed chemical methods to prepare hypothiocyanite, shown that the product is the same as that produced by defensive peroxidases, and demonstrated the molecular structure is OSCN⁻ (as opposed to alternative formulations), 2. we have investigated the (SCN)₂/OSCN⁻ equilibrium under acidic conditions, 3. we have characterized a hydrolysis product of OSCN⁻, carbamothioperoxoic acid (H₂NC(=O)SOH), which is a new class of inorganic compounds that may have relevance in human innate defense, 4. we have published a series of detailed mechanistic studies of reactive derivatives of cysteine, including the first mechanistic study of cysteine sulfenic acid (CySOH, which is the only common oxidation state of cysteine that has never been isolated and the hydrolysis product of CySSCN, the first product observed when OSCN⁻ reacts with CySH).