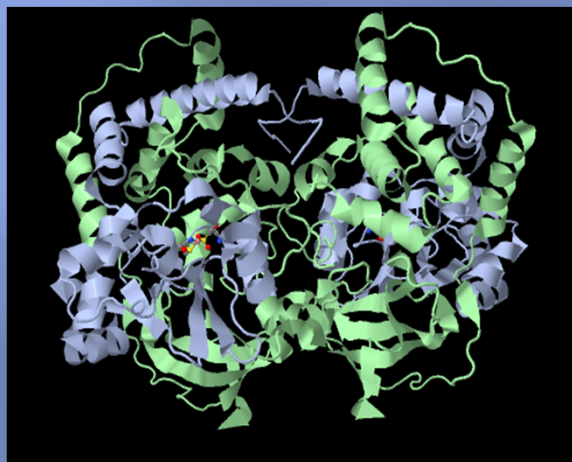


Conversion of Nitriles to Amides: Novel Biomaterials for Petroleum Feedstock Refining

Richard C. Holz, Department of Chemistry and Biochemistry, Loyola University Chicago, Chicago, IL 60626

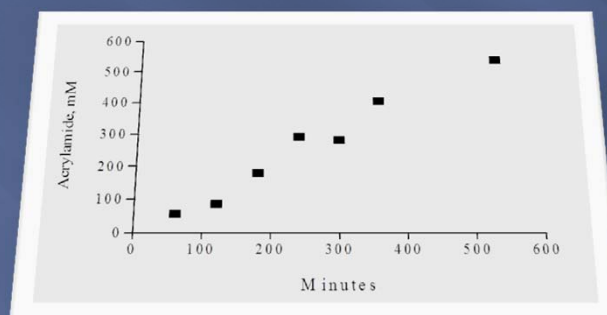
Nitrile Hydratase Biocatalysts: Immobilization of enzymes and proteins within silica glasses derived through sol-gel processing has resulted in the generation of novel, functional biomaterials which are typically optically transparent and sufficiently porous to permit small substrates access to the entrapped enzyme.



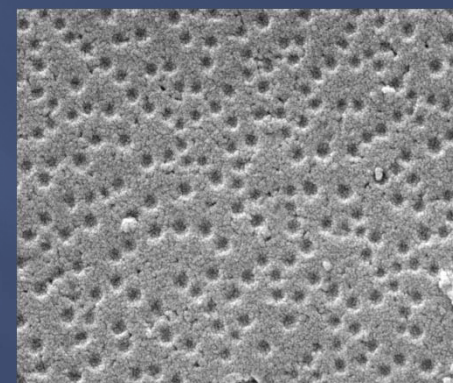
X-ray structure of the nitrile hydratase from *Pseudonocardia thermophila* JCM 3095 (*PtNHase*).

We have prepared new, functional biomaterials by immobilizing NHase enzymes within silica glasses derived through sol-gel processing.

Nitrile hydratase (NHase, EC 4.2.1.84), one of the enzymes in the nitrile degradation pathway, catalyzes the hydrolysis of nitriles to their corresponding higher value amides in a chemo-, regio, and/or enantio-selective manner at ambient pressures and temperatures at physiological pH. NHases have attracted substantial interest as biocatalysts for industrial applications such as the large scale production of acrylamide and nicotinamide.



Plot of product (acrylamide) vs. time showing the activity of the *PtNHase*:sol-gel biomaterial.



TEM of a *PtNHase*:sol-gel biomaterial.