Coherent X-ray Diffraction from Sub-micron Protein Crystals. Celine Besnard², Francesco Gramiccia³, Sebastian Basso¹, Cameron Kewish⁴, Phil Pattison⁵, Franz Pfeiffer, Marc Schlitz⁶. ¹Laboratory of Crystallography, EPFL, Switzerland. ²Laboratory of Crystallography, University of Geneva, Switzerland. ³SLS, PSI, Switzerland. ⁴SNBL, ESRF, Grenoble, France. ⁵Département Physik, TU München, Germany. 
E-mail: Celine.besnard@unige.ch

When a crystal is illuminating by a coherent X-ray beam, the Bragg peaks are superimposed with a complex coherent interference pattern. This effect has been observed on nanocrystals of lead, gold, silver and other relatively simple materials [1]. Extending the study of coherent effects to more complex materials such as protein is of great importance, since it opens the possibility of solving the crystallographic phase problem by oversampling [2]. We report here the observation of coherent scattering effects on powder preparations of sub-micron crystals of D-xylose isomerase. The crystals were illuminated by a coherent X-ray beam, using the cSAXS Beamline at SLS, Switzerland. The powder rings consist of discrete Bragg peaks which display clear star-shaped features (Fig 1) as well as truncation rods. We performed analytical calculations of the crystal shape transform [3] and were able to reproduce the observed features, thereby demonstrating that they are related to the crystal size and shape. The coherent scattering effects add a new dimension of complexity to the analysis of protein powder diffraction data, which is of importance for proposed applications at X-ray free-electron laser sources [4].

Keywords: coherent diffraction; protein crystals

Structure and Electrochemical Study of (Z)-1,2-Diphenyl-2-(phenylhydrazono)ethanone. Amel Djedouania, Massouede Yahiaoui, Abderrahmen Bendaas, Soufiane Bouacida. Laboratoire d’Electrochimie des Matériaux Moléculaires et Complexes, Université Farhat Abbas Sétif Algeria DZ 1900. Département de Chimie, Faculé des Sciences et Sciences de l’Ingénieur, Université A. Mira de Béjaïa, Route Targaun Ouzemour 06000, Algeria. E-mail: Djed_amelle@yahoo.fr

The synthesis and structure of Schiff bases have attracted much attention in biology and chemistry [1]. One of the aims of investigating the structural chemistry of Schiff bases is to develop protein and enzyme mimics [2]. Structural information is useful in investigating the coordination properties of Schiff bases functioning as ligands [3]. There are only a few reported crystal structures of Schiff bases derived from benzil [4]. A series of Schiff bases has been synthesized in our laboratory by the condensation of aromatic amines and diaromatic amines with carbonyl groups [5]. As part of the ongoing work, we recently synthesized the title compound, and determined its crystal structure.

The asymmetric unit contains two independent molecules, viz. A and B (Figure 1). Our work is dedicated for the synthesis, characterisation and electrochemical study survey of new phenylhydrazone, derivative from benzil and phenylhydrazone. These compounds were characterised by usual spectroscopic methods so as IR, NMR, and RX. The compound has the following structural properties: Triclinic, P1, a=11.739(2) Å, b=12.107(2)Å, c=12.521(2)Å, α=107.199(7)°, β=94.809(8)°, γ=107.535(7)°. An electrochemical study, by cyclic voltammetry for the the compound, has been achieved in aprotic medium, DMF-TBAHFB 0.1M, on a platin electrode of 2 mm of diameter. A cyclic sweep in the -1.8 to +1.8 V range show an anodic peak at 1.43V and two cathodic peaks at -0.717 V and -0.149 V.

Keywords: benzil; Schiff bases; cyclic voltammetry