requirement of specialised tools. Two alternative protocols for automated seeding experiments are described. One involves harnessing an animal whisker as the seeding tool. Larger, better ordered crystals were obtained using both techniques. The use of porous materials as nucleants for protein crystallization have been well documented over the past decade. Harnessing this porosity alongside the surface chemistry has the potential to yield nucleants of greater efficacy. To this end, we report on the first use of carbon-nanotube-based films. The nanotubes induced crystal nucleation in the metastable zone of the phase diagram for a range of proteins including the targets ‘Human Cardiac Myosin Binding Protein-C’ (MyBPC) and ‘Non-structural Protein 9 of the Transmissible Gastroenteritis Virus’. Furthermore, crystals of ‘MyBPC’ diffracted to a resolution of 1.6 Å improving on the previous limit of 3.0 Å. Thus, nanotube-based films are very promising candidates for future crystallisation trials of intractable proteins.

Keywords: protein crystallization-1, nucleants-2, carbon nanotubes-3

Attenuated Total Reflection-FT-IR Spectroscopic Imaging of Protein Crystallization. Naomi E. Chayen\(^a\), Lata Govada\(^b\), K. L. Andrew Chan\(^b\), Roslyn M. Bill\(^c\), Sergei G. Kazarian\(^d\), Rajesh Ponnusamy\(^b\), Jamie A. S. Cleaver\(^c\), Alan B. Dalton\(^c\), and Richard P. Sear\(^c\), \(^a\)Biomolecular Medicine, \(^b\)Institute of Biochemistry, University of Lubeck, \(^c\)Biomolecular Medicine, Department of Surgery and Cancer, Faculty of Medicine, \(^d\)Institute of Biochemistry, University of Lubeck, Ratzburger Allee 160, 23538 Lubeck, Germany

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A technique leading to the formation of the highest ever diffracting crystals of ‘Human Myosin Binding Protein C’ (MyBPC) is described. This method was initially designed to facilitate the use of the microbatch method in microgravity. The crystallisation vessels currently employed for microgravity crystallisation are non-optimal with regards to cost, sample volume, size and ease of use. The utilisation of microbatch experiments is a favourable alternative in each respect: To date, the use of microbatch has not been pursued due to concerns of oil leakage. To address this issue, a novel approach is described where the microbatch plates are inverted throughout the duration of the experiment. The findings intimate the application of the microbatch method to space flight and the potential to significantly increase the output of microgravity crystallisation research. Furthermore, crystallisation in the inverted position was found to be enhanced with crystals of the target MyBPC diffracting to the best ever obtained resolution of 1.2Å. It is proposed that this can be attributed to the negation of drop contact with the crystallisation vessel enabled by this method in a manner similar to containerless crystallisation.

Keywords: protein crystallization, optimization, microbatch