

Water-encapsulated protein source for x-ray serial crystallography

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A reliable source of micron size water droplets has been constructed for the purpose of delivering water-encapsulated protein for x-ray serial crystallography. A linear stream of droplets of negligible divergence is produced by accelerating a liquid water jet through a high pressure gradient[1] inside a converging gas nozzle. Using a coflowing gas rather than using the nozzle walls to squeeze the liquid jet to smaller diameter eliminates the problem of clogging that has thus far limited the minimum size of Rayleigh nozzle jets. The droplet stream can be either ejected from the gas nozzle into vacuum or produced within a hollow fiber optic tube to allow for further reduction in droplet size by evaporation. The source consists of two parts, an inner water nozzle and concentric outer gas nozzle of exit diameters about 20 μm and 10 μm respectively. The alignment of two parts is permanently fixed upon assembly; droplet size is controlled through water and gas pressures.

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1. Ganan-Calvo, A.M. and A. Barrero, *A novel pneumatic technique to generate steady capillary microjets*. Journal of Aerosol Science, 1999. **30**(1): p. 117-125.