ESRF	**Experiment tide:** Structure and dynamics in concentrated solutions of fractal aggregates of metal Colloids - studied by ultra small angle x-ray scattering and x-ray photon correlation spectroscopy	**Experiment number:** SC-382
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Report:

We have used the recently introduced technique of x-ray photon correlation spectroscopy [l] to study the diffusive dynamics of a colloidal palladium aggregate sol under dilute and semidilute conditions. The results were compared to measurements of the static structure factor of the same solutions performed with the Bonse-Hart camera on beamline 2. The comparison of static and dynamic data gives insight into structural features which are indiscernable by one technique alone.

Fig. 1 shows the static structure factor of the aggregate sols at different concentrations over a broad q-range. The aggregates exhibit a fractal internal structure. From the shape of the scattering curves at low q the size of the aggregates can be determined.

Correlation functions of the same samples obtained in the x-ray photon correlation experiment are shown as an example in Fig. 2 . From the correlations functions which were measured in a q-range from $1 \cdot 10^{-3}$Å^{-1} to $8 \cdot 10^{-3}$Å^{-1} a diffusion coefficient can be determined. At low concentration we find that the size of the aggregates as determined from the static structure factor and from the value of the diffusion coefficient agree. At high concentration the aggregates start to overlap, and the apparent diffusion constant decreases, while the system remains still in a liquid-like state.

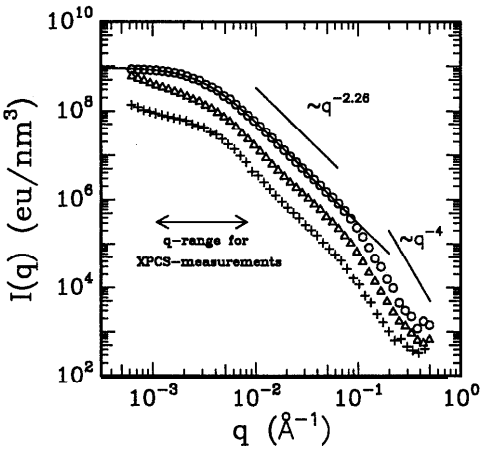

Fig. 1

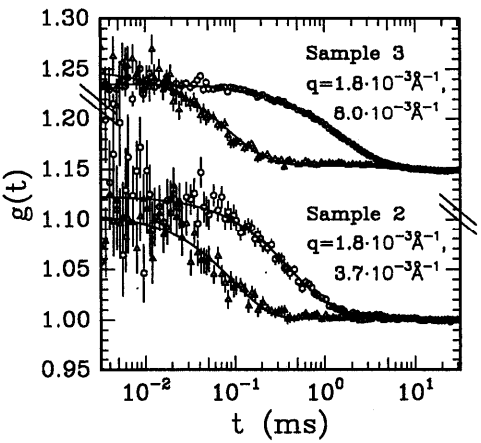

Fig. 2

Reference:

[l] T. Thurn-Albrecht, W. Steffen, Patkowski, G. Meier, E. W. Fischer, G. Grübel, and D.L. Abernathy, Phys. Rev. Lett. 77,5437 (1996).