Invited for this month’s cover picture is the group of Evgeny A. Kataev at the Technical University Chemnitz. The cover picture shows the authors’ association of fluorescence anion sensing with pearl hunting – the activity of recovering pearls from wild molluscs. In the presented work, the group of Kataev has developed a new water-soluble amido-amine azacryptand bearing a fluorescence anthracene dicarboxamide fragment. With the help of the fluorescent receptors (a hand) one can catch the phosphate anion (a glowing pearl) and visualize this binding event. The recognition of phosphate and oxalate has led to a fluorescent enhancement in a selective manner. Read the full text of their Communication at 10.1002/open.201900309.

What was the inspiration for this cover design? 

It is always a great excitement for the members of the research group, when a host molecule, for which several months of synthetic work has been spent, performs as proposed. It is a pleasure to see that a solution with the substance starts to glow after addition of an analyte under UV-lamp. Achieving high selectivity in host-guest recognition has been always a great challenge in supramolecular chemistry. There are sometimes so many stumbling stones on the way to a good selectivity that it reminds us of a pearl hunting from considerable depth.

What prompted you to investigate this topic/problem? 

Anionic species are pervasive throughout biological systems and environment. This is the reason, why anion recognition and sensing has attracted considerable attention in recent years. The current focus in the field is the development of new hosts that are able of selective binding of anions in aqueous solutions in the presence of other potentially competing species. Most of the anions are spectroscopically silent and therefore it is a significant challenge not only to bind a specific anion, but also to visualize the binding event. Towards this goal, we focus our effort on inventing new mechanisms for transferring of a binding event to a fluorescence answer.

What aspects of this project do you find most exciting? 

The emission of fluorophores depends on a number of parameters such as solvent, temperature, properties of interacting species etc. We often find that newly developed fluorescent receptors behaves unexpectedly with some classes of guests. The most exciting aspect of our studies is usually to reveal the exact reason (sensing mechanism) for fluorescence changes and understand major non-covalent interactions involved in host-guest stabilization that lead to a selective response.