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VABILO NA PREDAVANJE
V OKVIRU DOKTORSKEGA ŠTUDIJA
KEMIJSKE ZNANOSTI

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z naslovom:

Towards a general theory of chemical evolution

v sredo, 17. maja 2017 ob 15:00 uri
v predavalnici 1 v 1. nadstropju Fakultete
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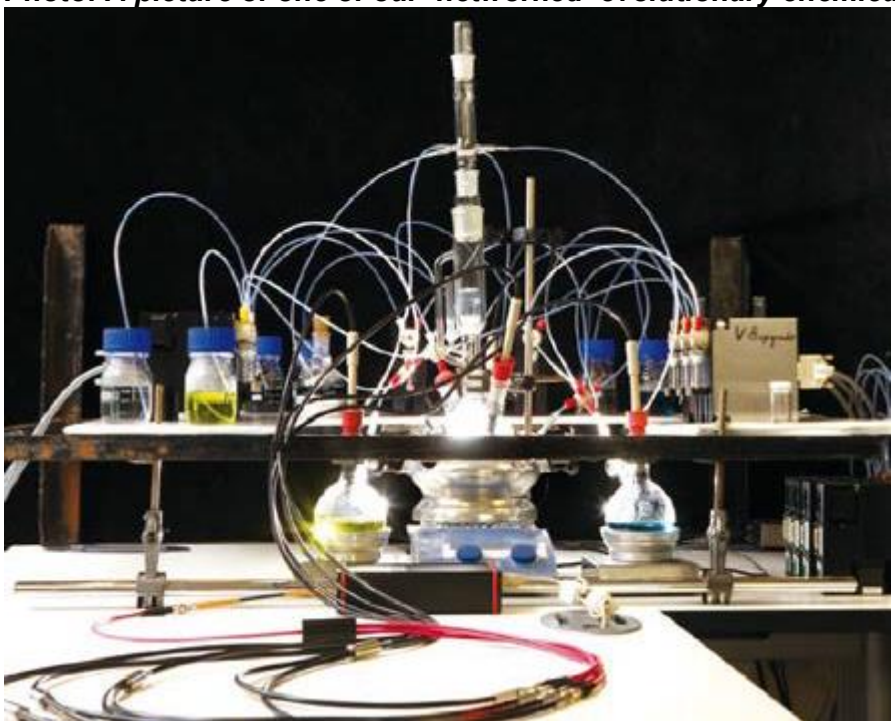
Vljudno vabljeni!

Abstract:

What is life? How did life start on planet earth *ca.* 3.5 billion years ago, and which molecules / chemical systems lead to biology? Is there are general theory of evolution that extends to all matter? Can we make or evolve life from scratch in a matter of hours? These are fantastically interesting questions but in this lecture, rather than look back into the past, we will look to the future and discuss how chemists may go about creating new types of truly synthetic (artificial life, new or 'inorganic' biology). In embarking upon this quest we will be asking the question "What is the minimal chemical system that can undergo Darwinian evolution?" and in doing so looking towards the concept of 'adaptive matter' and evolvable materials and chemical systems. The aim is inorganic biology, or more simply, a living system that does not the current chemical infrastructure utilized by biology.

Photo: A picture of one of our 'networked' evolutionary chemical systems



This lecture describes our work towards the development of inorganic systems capable of evolution as a fundamentally less complex 'emergent' model of prebiotic evolution that pre-dates the RNA / DNA world. In synergy we are also developing a new paradigm for evolution outside of biology, towards an experimental framework leading to the search for minimal evolvable inorganic chemical entities. This is because minimal self-assembling inorganic systems capable of catalysis and replication may provide a route to cross the information threshold where the number of evolvable bits (Eb) exceeds that required to start the process (Ib). Ultimately this approach could allow us to (re)discover biology relevant to life in earth as it is today or to develop a totally new 'inorganic biology'. We postulate that the evolvable pre-biotic inorganic systems could be considered to be minimal life forms (Eb>Ib) and could therefore represent a new testable approach to explore the origin of life, as well as allowing the engineering of new biology's from the bottom up (expanding possible interplanetary chemistries capable of life). We consider life to be a replicative population-based ensemble of unstable entities, capable through evolution giving a fitter population as a function of generations capable of survival. Such entities, through generational survival, naturally acquire information content with a measureable increase in functional 'bit-content' (at least initially) and provide a roadmap to progress towards the complexity of contemporary biological systems whereby the key step is the transition to evolution.