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From German into English

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# Isothermal *In Vitro* Selection and Amplification to Investigate Evolutionary Processes

Dissertation  
to obtain the Doctor of Philosophy degree  
from the Faculty of Chemistry  
at Ruhr-University Bochum

submitted by  
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1<sup>st</sup> Principal Investigator: Prof. Dr. J. S. McCaskill

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### **Abstract**

The development of a system is presented here that uses simple *in vitro* biochemical systems to investigate evolutionary processes. As a biochemical reaction, SDA (strand displacement amplification) was developed further as a DNA amplification mechanism and was adapted to meet the requirements of an *in vitro* evolution experiment. In addition to a SELEX setup based on the mutation and selection of nucleic acids, the system was adapted with regard to developing a self-contained evolvable system. Thus, it was demonstrated how the amplification mechanism can be controlled in microfluidic structures - a step toward complex systems that will help answer fundamental questions about evolution.

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