COMPOSITIONALLY COMPLEX ALLOYS (CCA) AS HIGH TEMPERATURE MATERIALS (?) AND
INTRODUCTION TO A NEW GERMAN PRIORITY PROGRAMME

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By setting the maximum content of an element to 35 at.\%, high temperature tensile and oxidation behavior up to 1000°C using the elements Al, Co, Cr, Cu, Fe, Ni and Ti in various mixtures is observed. The alloy development is aiming to balance high temperature tensile strength and ductility with good oxidation resistance. The alloys are in a first step optimized by microstructural observations. One of the goals was to achieve an fcc matrix with precipitate hardening. This goal is deviating from the high entropy alloy (HEA) concept, which should yield to a simple, single-phase structure. For best high temperature properties, the precipitates should be stable up to at least 800°C. By this optimization route, carried out with the CALPHAD method, the composition moves towards known Ni-base superalloys. Temperature dependent mechanical properties and oxidation resistance of the finally obtained alloy is compared with commercial alloys (Inconel 617 and Alloy 800H).

Funding from the German Research Foundation (DFG) for a Priority Programme entitled CCA-HEA will start in October 2017, for initially 3 years with a possible extension of up to 6 years in total. Financial support of about 20 PhD students is anticipated. A brief overview of goals and time schedule will be presented.

**Keywords:** high temperature, mechanical properties, oxidation

**References:**

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