Abstract:
Determination of the flow stress curve is an important step for precisely describing material behavior in Finite Element simulations. The flow stress curve is generally determined by taking a uniaxial tensile test as a standard. In the case of very thin sheet, since the fracture is generated at a low strain, there is not enough uniaxial data obtained to be applied in the FE simulation. The reason for this is that charactering plastic deformation at a large strain values by extrapolating a flow stress curve which is based on insufficient measurement data is highly susceptible to error. Bulge test is useful method for determining the equivalent biaxial flow stress curve up to a large strain. In this paper, the biaxial flow stresses curve for very thin copper sheet with thickness 35 and 50 μm were determined using the aero-bulge test. A new empirical model was derived for the estimation of the sheet thickness at the pole. After the compatibility between uniaxial and biaxial flow stresses was verified, the uniaxial flow stress curve was determined from the aero-bulge test using reverse engineering. The methodology of extrapolation of the flow stress curve at a large strain was finally
proposed for application in FE simulations.

**Stichworte:**
Aero-bulge test; FE simulation; Flow stress curve; Micro forming

**Herausgeber:**
Trans Tech Publications

**Kongress- / Buchtitel:**
International Conference on Advances in Materials and Processing Technologies, AMPT 2009

**Jahr:**
2011

**Nachgewiesen in:**
Scopus

**E-ISBN:**
978-303785053-4

**Serien-ISSN:**
10226680

**Revied:**
ja

**Sprache:**
en

**TUM Einrichtung:**
Lehrstuhl für Umformtechnik und Gießereiwesen

**Occurences:**
· Einrichtungen > Fakultäten > Fakultät für Maschinenwesen > Institut für Werkstoffe und Verarbeitung > Lehrstuhl für Umformtechnik und Gießereiwesen (Prof. Volk) > 2011

**entries:**