ATDI

Doctoral School on Material Sciences and Technologies
30 January 2023 | Budapest, Hungary

Óbuda University

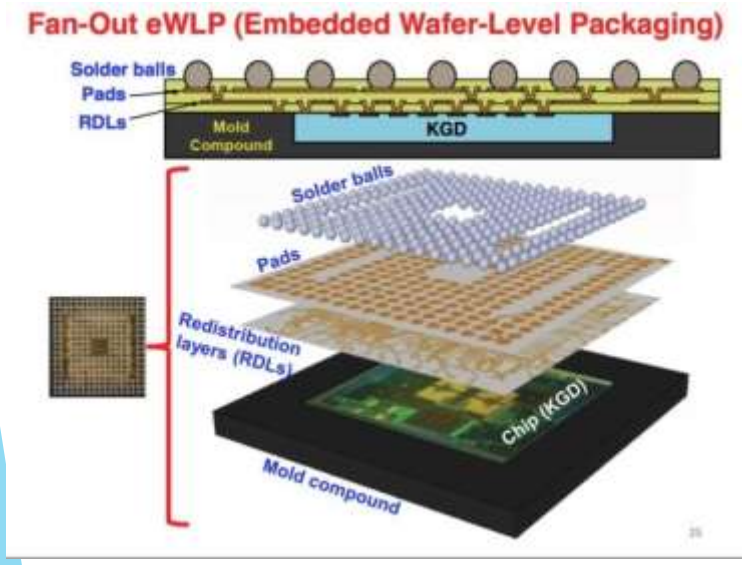
Semester Report - Fall 2022/2023

Modeling lead-free interconnect reliability under creep in advanced packaging.

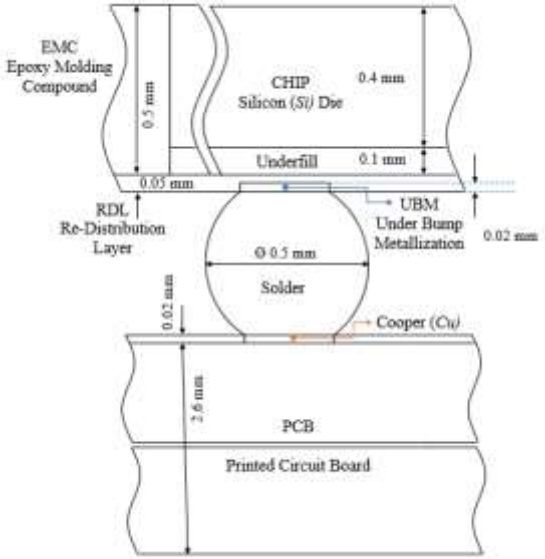
Student: *Vargas Ramiro;* ***Supervisor:*** *Dr.* Gonda Viktor

Contents

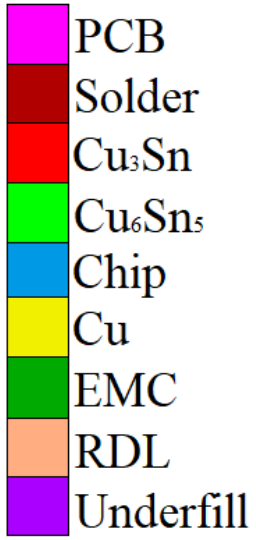
Fan Out Wafer Level Packaging

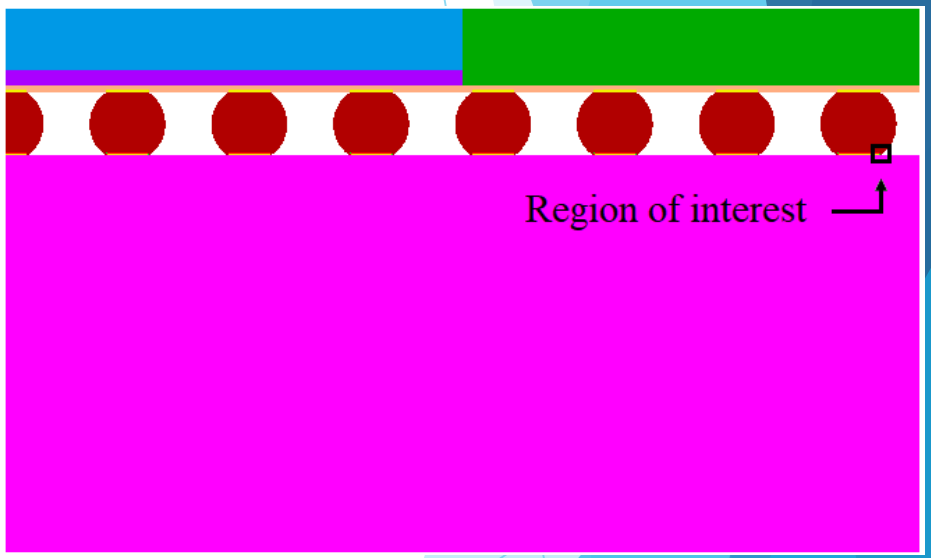


Exploded view



2D Layout





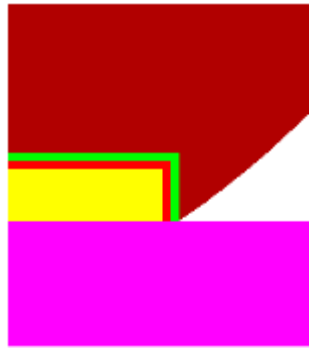
2D Model

Added Value

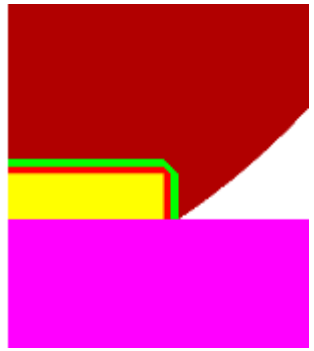
SUMMARY OF STUDY CASES

Element	Material
2D / 3D	SAC305 / SACQ
IMC	**Edge**
NI / I*	Sharp / Chamfer

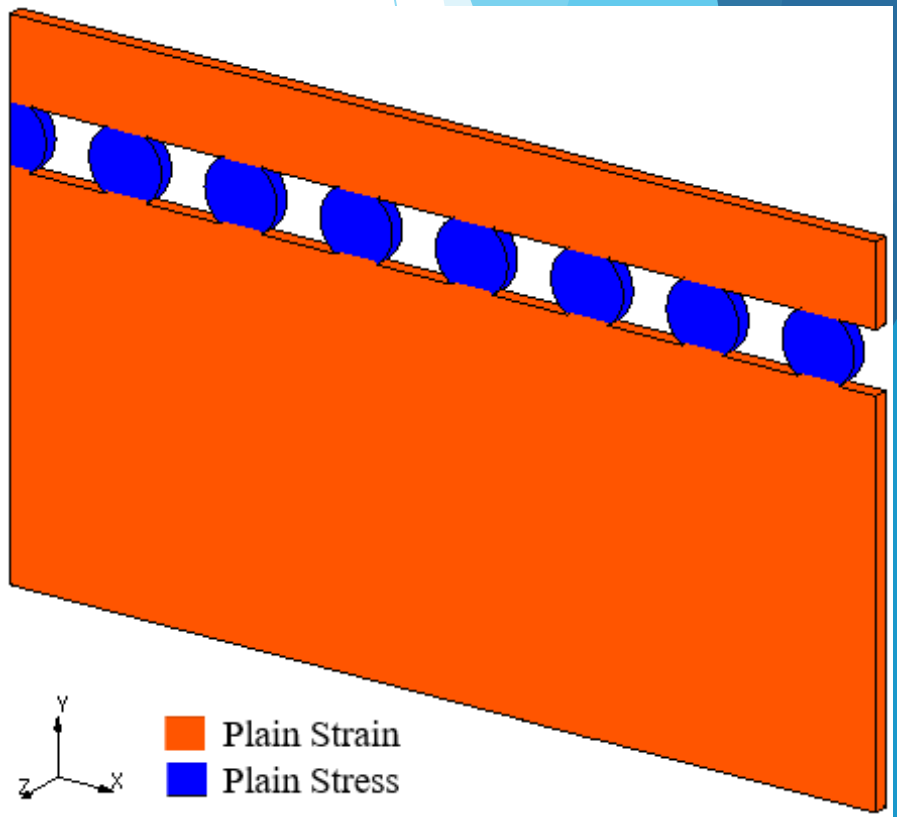
*NI: No IMC layers included, I: IMC layers included



SHARP EDGE



CHAMFER



Results - previous semesters

Acta Polytechnica Hungarica Vol. 19, No. 7, 2022

Creep and Reliability Prediction of a Fan-Out WLP Influenced by the Visco-Plastic Properties of the Solder

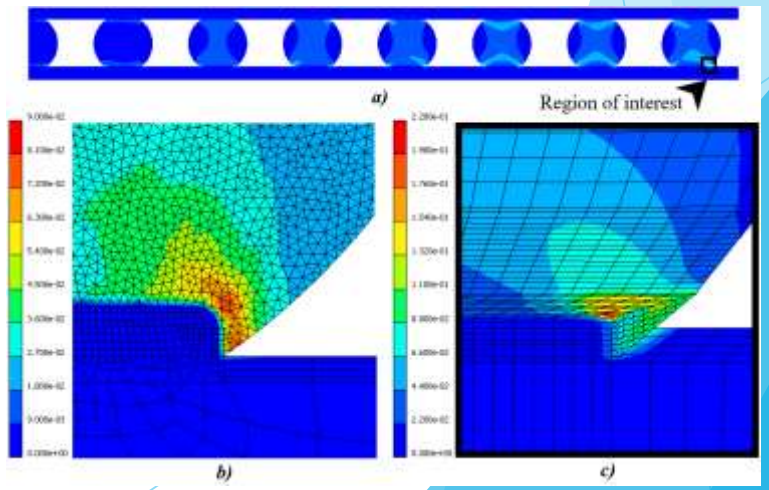
Ramiro Sebastian Vargas Cruz[1] and Viktor Gonda[2]

[1]Óbuda University, Doctoral School on Materials Sciences and Technologies, Bécsi út 96/b, 1034 Budapest, Hungary
ramiro.vargas@stud.uni-obuda.hu

[2]Óbuda University, Donát Bánki Faculty Mechanical and of Safety Engineering, Népszínház u. 8, 1081 Budapest, Hungary
gonda.viktor@bgk.uni-obuda.hu

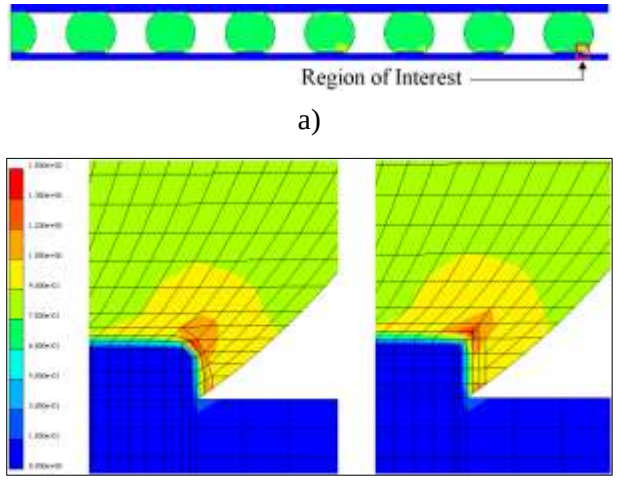
Most relevant conclusion

A change in the copper pad profile shape (squared to rounded) shows a stress reduction and, therefore, more stable creep curves. Additionally, it accentuates the difference of creep values between materials by nearly 16% regarding strain.

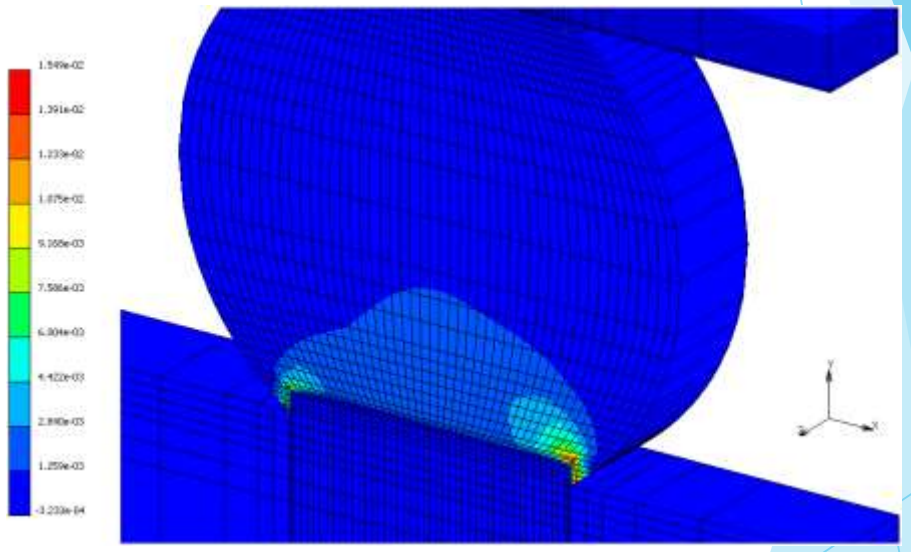


Results - current semester (1/2)

Creep and Strain Energy analysis of a FO-WLP simulation influenced by Cu pad geometry, and IMC



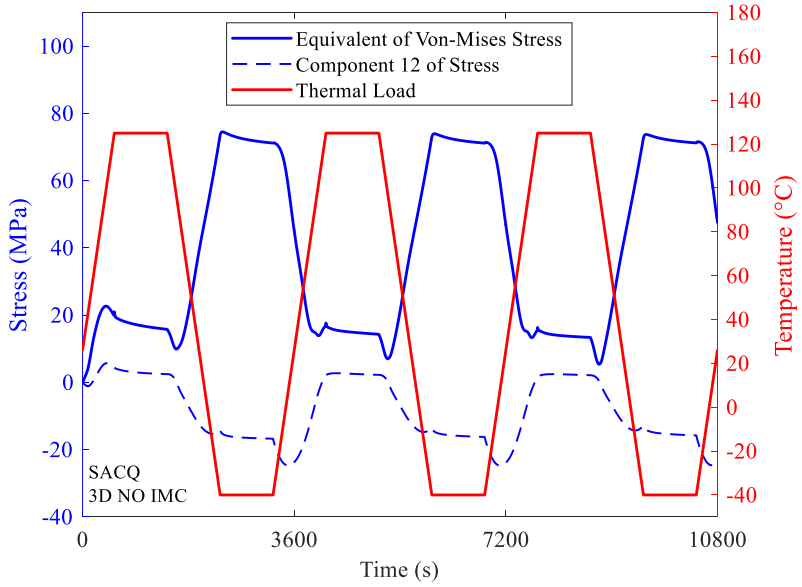
Total Equivalent of Creep Strain at the end of the three cycles: *a) TECS distribution along the solder bumps (cropped image), augmented contour band graph of TECS distribution at the vicinity of the critical node, b) Chamfer Cu pad profile, and; c) Sharp Cu pad profile.*



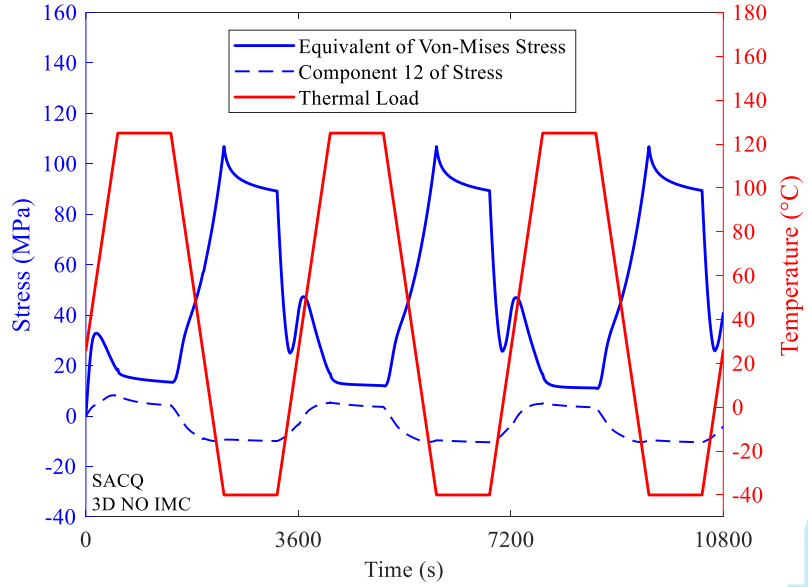
Total Equivalent of Creep Strain at the end of the three cycles. 3D-Sharp-SAC305-IMC included case.

Results - current semester (2/2)

Effect of the bond pad geometry



Chamfer



Sharp

Von Mises Stress and Stress Component 12 (S_{12}) vs. Thermal Load

Thanks for your kind attention

Questions?