

# Xenolyte<sup>®</sup> Pd HS

## Pure electroless Pd plating



Electronics

Semiconductor

atotech.com

## Pure Pd deposits for high-reliability pad metallization and RDL housing

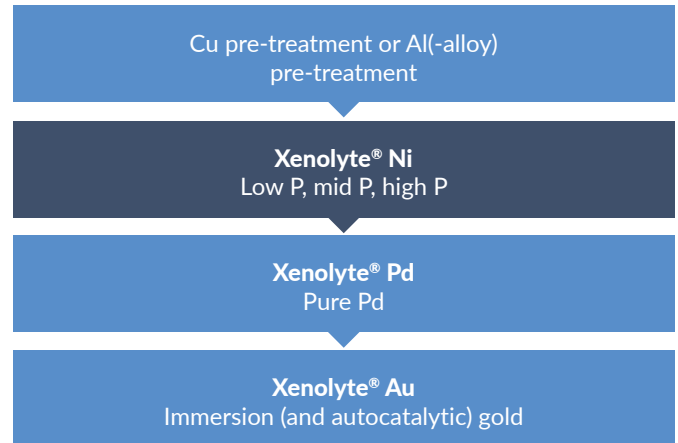
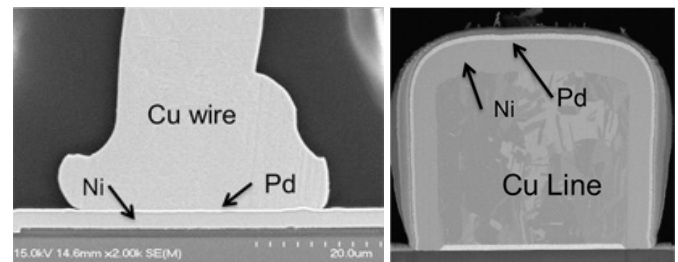
### Xenolyte<sup>®</sup> Pd HS in ENEPIG and ENEP applications

Xenolyte<sup>®</sup> Pd HS is part of our Xenolyte<sup>®</sup> portfolio. The portfolio includes processes and products for cleaning and activation pre-treatment solutions, as well as plating chemistries for the electroless deposition of nickel, palladium, and gold on Cu and Al. The primary applications are ENEPIG/ ENEP pad metallization and RDL housing, which enables hard, corrosion-free, and stress-minimized metal stacks to protect underlying active structures and provide a robust, stable, and low-resistance solder joint connection to the IC substrate.

Xenolyte<sup>®</sup> Pd HS is our autocatalytic Pd process of choice for the deposition of pure Pd layers and perfectly addresses the requirements of the automotive and power semiconductor industries.

### Features and benefits

- Pure Pd deposit – No P co-deposition
- Qualified for automotive applications and MEMS
- Perfect surface finish for highest reliability applications
- Long bath life-time
- High volume manufacturing proven



**Figure 1:**  
Top: ENEP on pad for wire bonding and Cu RDL  
Bottom: Typical ENEPIG (ENEPAG) process scheme

# Pure Pd deposits for high reliability pad metallization and RDL housing

## Pure chemistry

Xenolyte® Pd HS allows plating of pure Pd deposits. Common processes for electroless plating of Pd lead to the co-deposition of phosphorous. This leads to amorphous PdP deposits with smaller ductility and stronger tensile stress than for pure, crystalline Pd deposits. Impurities (e.g., P) may additionally lead to segregations and hence impact the properties of the deposits such as conductivity and reliability.

Pure Pd has proven a better reliability in high temperature applications compared to PdP. Xenolyte® Pd HS is hence the electrolyte of choice for power semiconductor applications, for example in the automotive industry.

## High process reliability and stability

While common Pd processes exhibit a strong deposition rate drop, especially in the beginning of the bath life-time, Xenolyte® Pd HS maintains a stable deposition rate over the entire extended bath life-time. This results in better process reliability and performance.

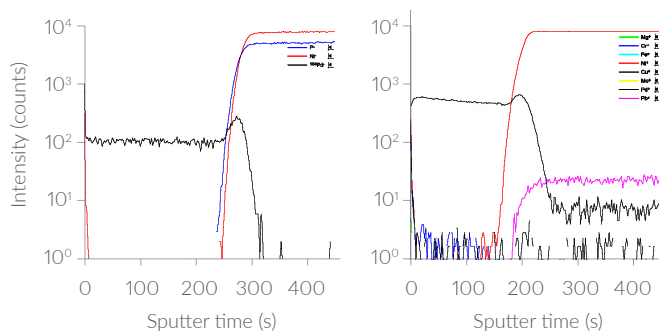


Figure 2: ToF-SIMS analysis of plated Xenolyte® Pd HS (ENEP) in negative (left) and positive (right) mode

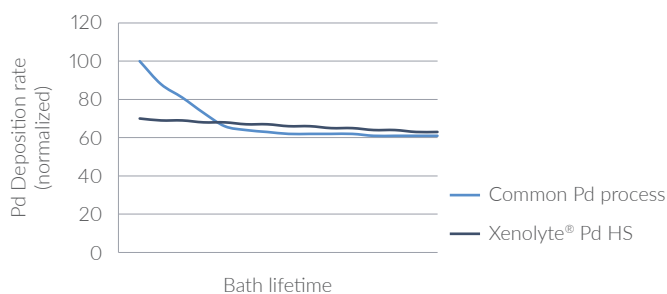


Figure 3: Normalized Pd deposition rate over bath life-time of a common Pd process vs. Xenolyte® Pd HS

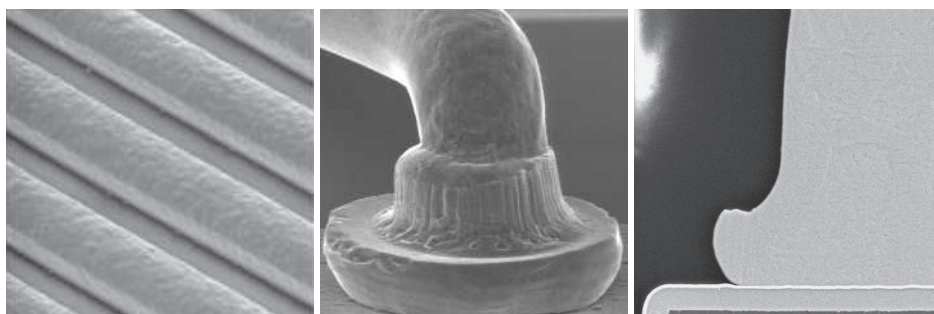


Figure 4: 1) Housing for Cu RDL with Ni/Pd for power application; 2) ENIG stack for Cu wire bonding; 3) Ni/Pd stack for Cu wire bonding

## Product overview

- Xenolyte® Pd Make Up HS
- Xenolyte® Pd Replenisher HS
- Xenolyte® Pd Reducer HS
- Optional: Xenolyte® Pd Stabilizer HS

