Drug release

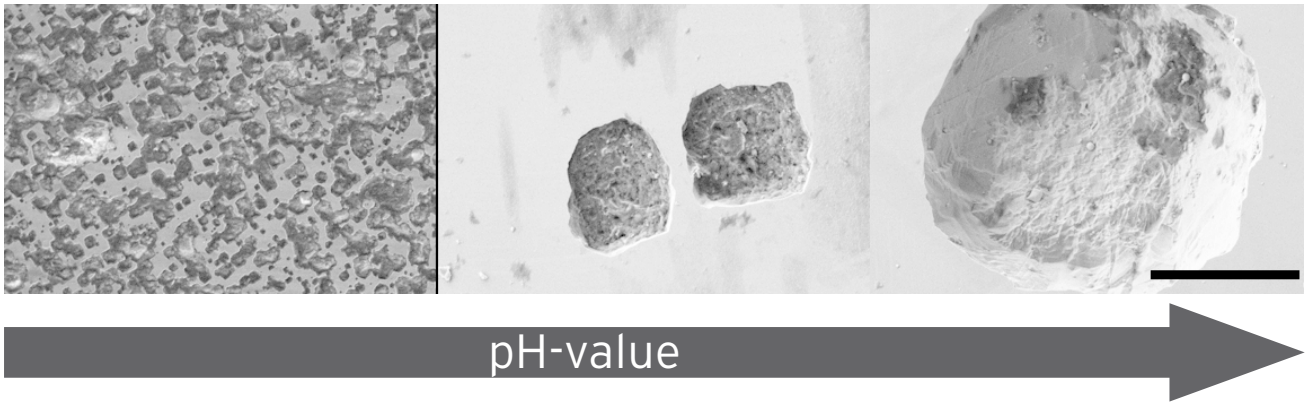
Micro-porous implant surfaces for drug release and improved tissue integration

- Development of tailored etching process to introduce pores of well-defined average size in implants made from medical alloys
- Development of processes for the deposition of drugs in pores
- Assessment of drug release kinetics
- Detailed SOP to enable transfer of technology to client
- Technology transfer to client

The development process comprises three steps

1. Development or adaptation of electrochemical etching process to specific medical alloy of interest

Electrolytes and electrochemical etching parameters will be adapted and optimized towards the specified medical alloy and the desired pore size



Variation of pH of the electrolyte enables determination of the average pore size (here: Phynox), scale bar: 10µm

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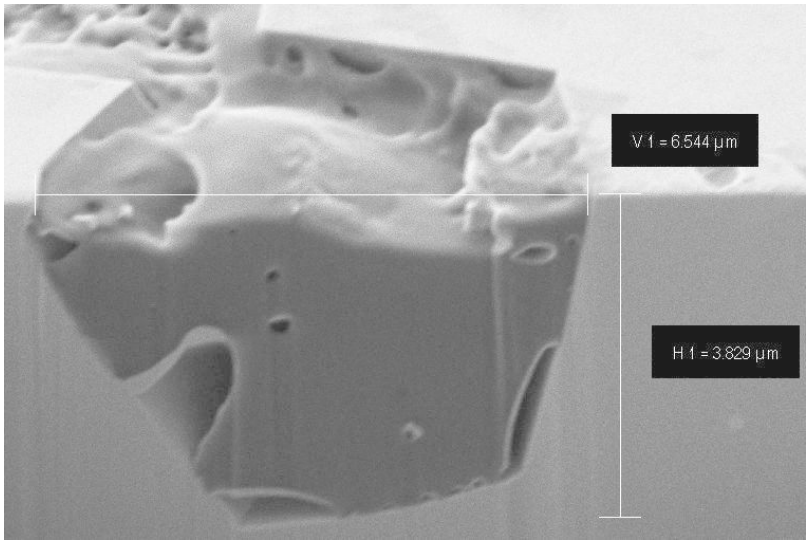
2. Deposition of drug in pores

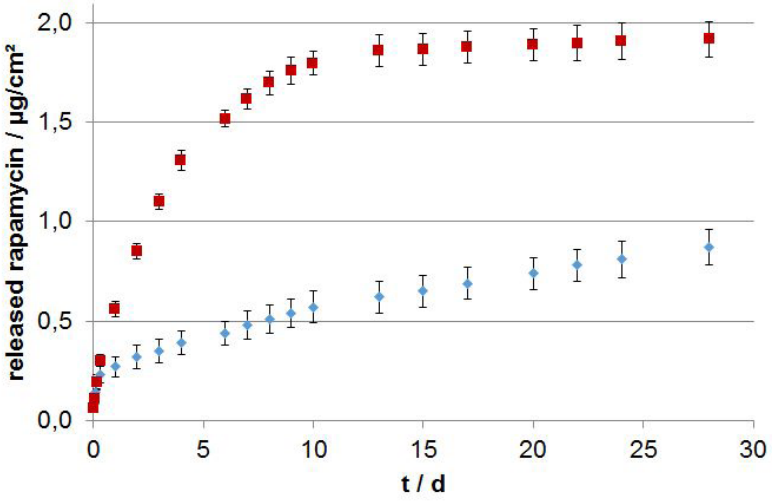
Pores are filled almost completely by the drug. Accompanying micro analysis (SEM) provides for validation of process parameters.



Rapamycin in pores of an etched coronary stent (L-605).

3. Assessment of drug release kinetics

Release kinetics of drug from micropores determined by incubation in test media and subsequent spectroscopy analysis suspension.



Continuing release of Rapamycin over 28 days from microporous coronary stent (blue) as compared to a stent comprising a polymer/drug coating showing considerably lower release duration.

Literature:
Fuchsberger, K., et al. (2016). "Electrochemical etching of micro-pores in medical grade cobalt-chromium alloy as reservoirs for drug eluting stents."
Journal of Materials Science: Materials in Medicine 27(3): 1-9.

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