Leucite Glass Ceramic for Dental Restoratives

**Significantly higher strength** (268 MPa) than the market leading leucite glass ceramic (IPS Empress, 165.5 MPa), resulting in lower failure rates and potential use in more indications.

**A translucent material** giving a high quality aesthetic and the opportunity to colour match.

**Easy to machine** reducing marginal leakage, secondary carries and restoration failure.

**Low-cost high-volume scale-up** demonstrated by collaboration with Cera Dynamics Ltd.


**Problem**
IPS Empress by Ivoclar-Vivadent, a leucite glass-ceramic dental restorative, was the market leader due to its excellent aesthetic properties. As a result of its low success rate in the posterior region and as a bridge, a stronger tougher glass ceramic IPS e.max has in recent years gain popularity. However, with its reduced aesthetics, there is a gap for a material with the aesthetics of Empress but the strength of e.max.

**Solution**
Researchers at Queen Mary University London have developed a new leucite glass-ceramic that has been designed using Appen factors so that it has a matched thermal and refractive index with the leucite crystal phase. This leads to no micro cracking in the glassy matrix in the glass-ceramic composite and a translucent and aesthetic material. Therefore a high volume fraction of leucite crystals can crystalize in the glass with no reduction in flexural strength or aesthetics.

**Development**

**Flexural Strength**
The graph opposite presents results of a comparison of the QMUL leucite glass-ceramic with commercial dental materials. The flexural strength is comparable to e.max and 54.6 % increased compared to Empress.

**Aesthetics**
The material has a good base translucency and colouring has been demonstrated which matches the vita shade guide (universally used in dentistry).

**Machinability**
A mean marginal gap of 6.91um after CAD-CAM, reducing marginal leakage, secondary carries and restoration failure.

**Scale-up**
Cera Dynamics Ltd, manufacturing partner have produced high-quality large scaled and milled glass batches. Therefore a cost effective supplier of material has been established.

*We are seeking a commercial partner to take this product to market. Please contact Adam Daykin on 02078825117/07795014016 or a.daykin@qmul.ac.uk to discuss.*