

Biaxial Flexural Strength and Molecular Compositions of IPS E.Max Press and Rosetta SP Lithium Disilicate Ceramic Systems

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Introduction

Lithium disilicate glass ceramic systems have recently been noted for their esthetic and mechanical properties. The purpose of this study is to measure the biaxial flexural strength and to perform x-ray diffraction (XRD) analyses on two lithium disilicate ceramic systems: IPS e.max Press (Ivoclar Vivadent AG, Liechtenstein) and Rosetta SP (HASS, Korea).

Materials & Methods

- IPS e.max press LT A2 ingots / Rosetta SP LT A2 ingots
- Pressing furnace, Horizon (Shenpaz, Israel) was used for pressing ;
 - Pressing schedule : 700°C start → raised by 60°C/min → 920°C for 25min → pressing
- Cutting by diamond wheel → Finishing by 120mesh, 300mesh → Polishing by 6 μ m, 3 μ m, 1 μ m diamond particle
 - 25 specimens for each system
 - All specimens were standardized according to ISO 6872 ; diameter=16.0 \pm 0.1mm, thickness=1.2 \pm 0.01mm
- Piston-on-three ball test was used for biaxial flexural strength ; piston tip diameter=1.4mm, support circle diameter=12.0mm
- XRD analysis ; diffraction angle=10-80°, scanning speed= 5°/min, 20 Kv, 40 mA
 - Calculation of degree of crystallinity

Results

1. There was a significant difference in biaxial flexural strength between IPS e.max press and Rosetta SP (Fig 1).
2. In the XRD analysis, both specimens showed similar patterns. The peak levels of both specimens almost corresponded to the peak level of standard lithium disilicate (Fig 2).
3. The degree of crystallinity of Rosetta SP is higher than IPS e.max. press. (Fig 3).

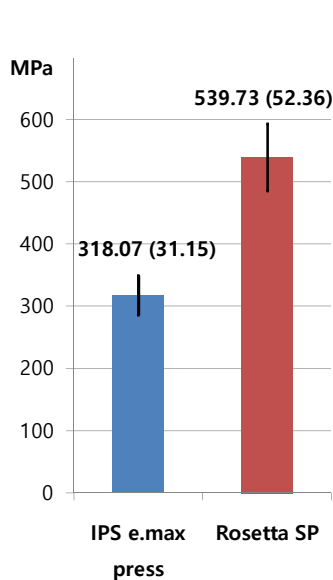


Fig 1. The mean value of biaxial flexural strength in megapascal (MPa)

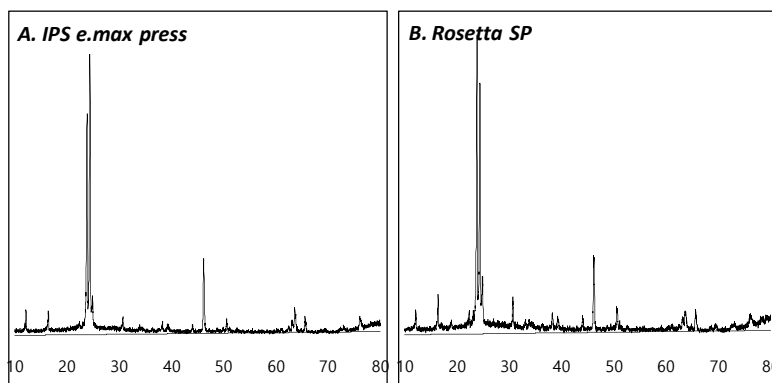


Fig 2. The result of XRD analysis ; Both specimens showed similar pattern.

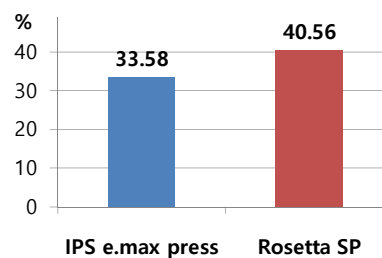


Fig 3. The degree of crystallinity of IPS e.max press & Rosetta SP

Conclusion

Rosetta SP exhibited significantly higher flexural strength than IPS e.max press, and the molecular composition of both was shown to be almost pure lithium disilicate. However, the degree of crystallinity of Rosetta SP is higher than IPS e.max. press.

Acknowledgement

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