Abstract

The global demand on medical ceramics / ceramic components last year was valued at approximately US$12.3 billion. Global medical ceramics / ceramic component market will see 6.0-6.5% annual growth rate in the coming years driven by strong demand from application markets such as implantable electronic devices, medical coatings, diagnostics instruments. The market is expected to reach US$14.7 billion by 2017 and to increase to US$17.6 billion by 2020.

Alumina (Al2O3) is the largest material group of the medical ceramics, followed by zirconia (ZrO2). Roughly 40% of medical ceramic components are made of alumina, while around one fourth are based on zirconia. Alumina-zirconia composites continue to gain their market share.

Acmite Market Intelligence has updated a most comprehensive report on global medical ceramics market. It is ready for order.

The report examines the current products and application areas, provides extensive market data of 2014, and market forecast through 2017 to 2023. It also outlines the competition landscape, evaluates market chances and risks and anticipates future trends based on a series of influence factors.

- 221 pages analyzing the market
- 60 figure tables
- 260 medical ceramics manufacturers profiled

With a multi-dimensional and in-depth view of world biomedical metal market, this report is ideal help for you with decisions about international market penetration, business expansion or project feasibility analysis.
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Note:
Regions:
North America: US, Canada, Mexico (NAFTA region)
Asia Pacific: Countries of Asia, Australia, New Zealand
Asia Pacific*: Asia Pacific excluding Japan
4.1.3 Zirconia alumina

4.1.3.1 Product, properties and uses

Zirconia alumina are also called alumina-zirconia composites or zirconia toughened alumina. Zirconia alumina are ceramic materials comprising alumina and zirconia. It is an intermediate solution between pure alumina and pure zirconia. Zirconia toughened alumina (ZTA) typically consists of alumina with a 10 to 20 percent zirconia concentration, which enhances the strength of the alumina.

Properties

Zirconia alumina is engineered to manage tetragonal-monoclinic phase transformation in zirconia to improve the overall strength of the alumina matrix composite.

Its properties depend strongly on the mixing ratio of aluminium oxide to zirconium oxide, and on the details of the processing. AZ composites feature high strength, fracture toughness, elasticity, hardness, and wear resistance.

AZ composites are commonly used in structural applications, as cutting tools, and in many medical applications.

In comparison with aluminium oxide, low proportions of zirconium oxide (up to approx. 10% by volume) in the alumina-zirconia composites lead to improved values, such as
- bending strength
- KIC factor
- modulus of elasticity

... ...

(Vol.I P. 104)
5.2.2.3 Medical ceramics market in orthopaedic implant by region

Medical ceramics market in orthopaedic implant by region in US$ million

<table>
<thead>
<tr>
<th>Region</th>
<th>2014</th>
<th>2015</th>
<th>2017</th>
<th>2020</th>
<th>2023</th>
<th>CAGR</th>
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<tr>
<td>W. Europe</td>
<td>600</td>
<td>637</td>
<td>718</td>
<td>860</td>
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<td>N. America</td>
<td>747</td>
<td>795</td>
<td>900</td>
<td>1084</td>
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<tr>
<td>Japan</td>
<td>185</td>
<td>196</td>
<td>220</td>
<td>262</td>
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<td>Asia Pacific*</td>
<td>231</td>
<td>243</td>
<td>271</td>
<td>318</td>
<td>373</td>
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<td>ROW</td>
<td>83</td>
<td>87</td>
<td>94</td>
<td>108</td>
<td>122</td>
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<tr>
<td><strong>Total</strong></td>
<td>1845</td>
<td>1958</td>
<td>2204</td>
<td>2632</td>
<td>3144</td>
<td>6.1%</td>
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</tbody>
</table>

Medical ceramics market in orthopaedic implant by region in US$ million

![Bar chart showing medical ceramics market by region from 2014 to 2023 with CAGR values.]

Medical ceramics market in orthopaedic implant by region, 2014

![Pie chart showing market share by region in 2014.]

(Vol. I P.165)
5.4 Surgical instrument

5.4.1 Market segmentation

Ceramics have been increasingly used for surgical instrument. High-performance ceramics steadily expand into new fields of surgical instruments, driven by steadily development of ceramic technology and biomechanical engineering.

Ceramics are suitable for cutting tools. Ceramic cutting blades are also known for their sharpness, corrosion-free and non-magnetic properties. Zirconia ceramics is able to create extremely sharp blades that can last up to 100 times longer than traditional stainless steel cutting blades. However, ceramic materials are not recommended for uses that can result in heavy shock to the blade.

Ceramics are mainly used in following surgical instruments:
- Electrosurgical instruments, including electrosurgical instruments with conductive ceramics and electrosurgical instruments with wear-resistant ceramic inlay eliminates electrical cross circuits
- Ceramic nonpower surgical instruments such as tweezers, scalpels, forceps, etc, which normally has ceramic tips, ceramic blades.
- Ceramic coated surgical instruments. The ceramic coating provides an exceptional hard and smooth surface. This special treatment gives the scissors a high resistance to corrosion and chemicals. The special matte black ceramic coating avoids any reflection and provides a low-friction cut which minimizes tissue damage.
- Endoscopic components, e.g. ceramic tip insulation

Compared to medical metals, main important properties of ceramics for medical applications include: … …

(Vol.I P.177)
Ivoclar Vivadent AG (Liechtenstein)

Bendererstrasse 2
FL-9494 Schaan
Principality of Liechtenstein
Phone: +423 235 35 35
Fax: +423 235 33 60
http://www.ivoclarvivadent.com

Year of Foundation: 1923
Number of employees: 3,215
Revenue 2014: CHF 761 million

Company profile

Ivoclar Vivadent AG is a privately owned company specialized in the design, manufacturing and distribution of dental implants, instruments, and materials.

The company’s product and service offerings include
- Adhesives
- All-Ceramics
- Alloys
- Chairside CAD/CAM Blocks
- Clinical Accessories / Instruments
- Core Build-Up / Endodontics
- Equipment
- Impression Materials
- Luting Material
- Metal-Ceramics
- … …

(Vol. II P.86)
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