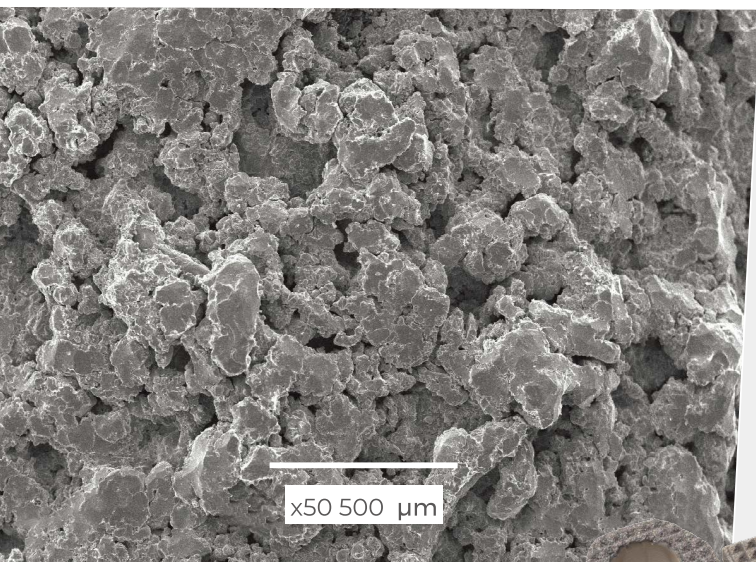


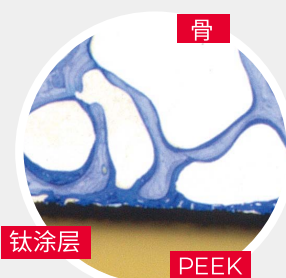
PEEK涂层

Spondycoat®和 TiGrowth® P:
应用于PEEK产品表面的全新等离子喷涂涂层系列



无涂层PEEK植入物表面与宿主骨的直接接触相当有限

含钛涂层的PEEK植入物表面与宿主骨有充分直接接触



特点与优势

- 可提供钛和羟基磷灰石涂层
- 高强度附着力
- 强化骨整合

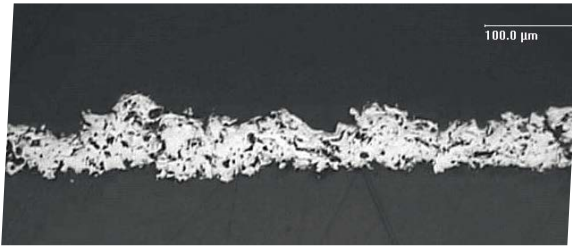
应用示例

- 椎体融合器
- 椎体置换
- 人工椎间盘置换
- 固定螺丝

PEEK是一种具有良好生物相容性的惰性生物材料,但**PEEK**材料的惰性及其有限的骨固定作用方面仍存在一定挑战。通过采用骨诱导材料(如羟基磷灰石和钛金属)的等离子喷涂涂层提高**PEEK**表面功能,有帮助含涂层的植入物实现直接骨整合。

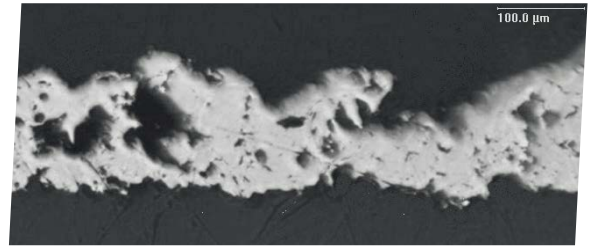
PEEK等离子喷涂涂层

SPONDYCOAT®-T 371A



Spondycoat®-T 371A是一种低粗糙度钛涂层(代表值 Ra 4-10 μm)，主要用于标识薄层(推荐厚度60-120 μm)。

SPONDYCOAT®-T 107



Spondycoat®-T 107是一种高粗糙度钛涂层(代表值Ra 20-40 μm)，推荐厚度为125-250 μm。

TIGROWTH® P



TiGrowth® P是一种高粗糙度多孔钛涂层(代表值Ra 40-80 μm)，推荐厚度为300-500 μm。

SPONDYCOAT®-HA



Spondycoat®-HA 是一种低粗糙度羟基磷灰石涂层(代表值Ra 4-8 μm)，主要用于标识薄涂层(推荐厚度45-85 μm)。

适用基材

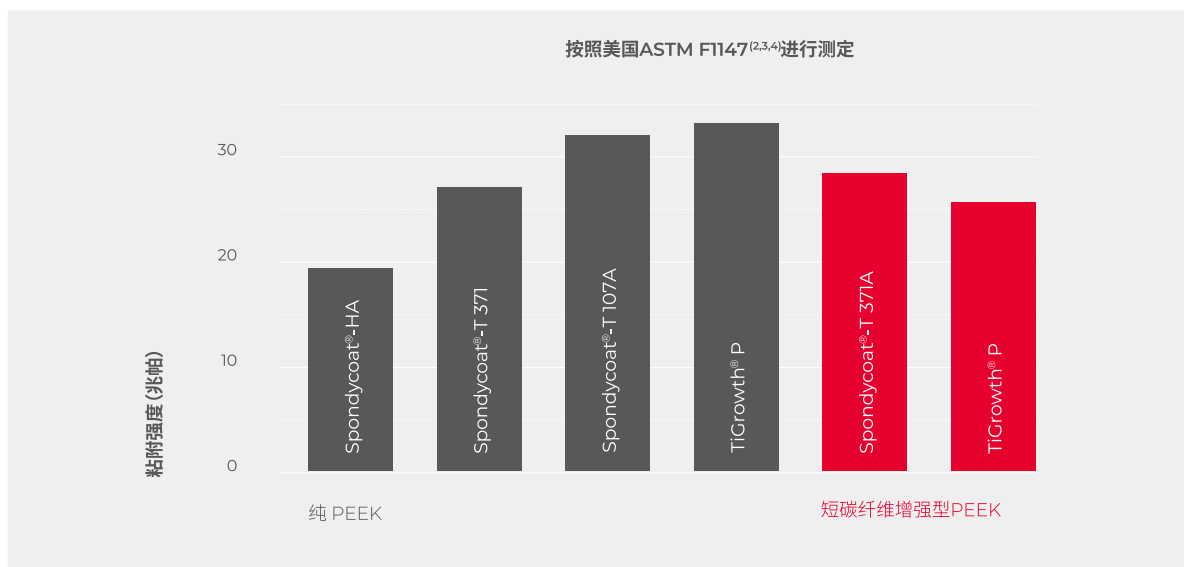
所有这些涂层可应用于以下材质的产品：

／ 纯PEEK ／ 短碳纤维增强型PEEK ／ 硫酸钡过滤PEEK

我们可提供更多涂层解决方案, 或根据特定要求开发。

所有Spondycoat® 和 TiGrowth® P涂层均符合ASTM标准和美国FDA指南要求。

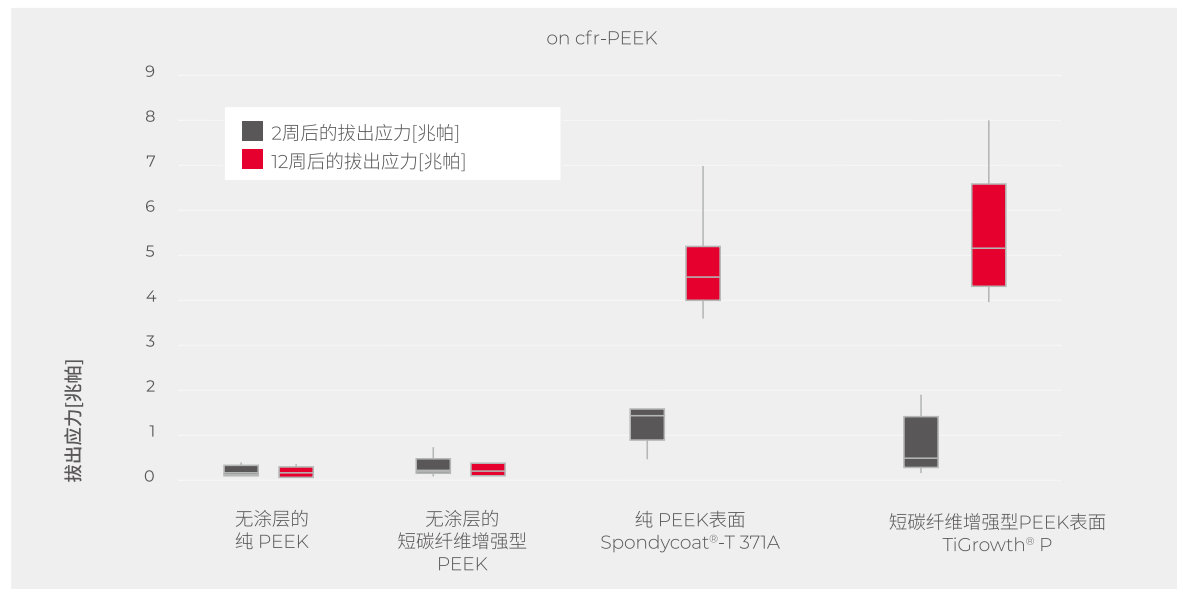
我们已收集了所有关于等离子喷涂工艺对PEEK材料性能影响的完整数据集, 可供索取。该数据集可以帮助植入物设计人员选择适合特定应用的合适涂层。



Spondycoat®和TiGrowth® P涂层的生物特征

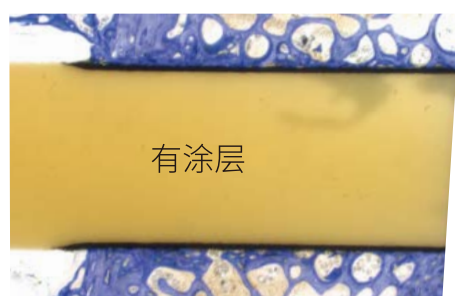
羊盆骨模型中的植入研究

通过拔出力测试植入物与宿主骨的固定情况^{6,7,8,9}

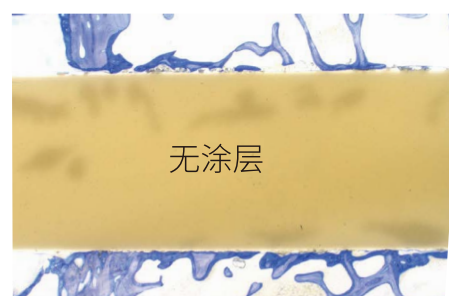


涂层会改善植入物与宿主骨的直接接触,在植入两周后使植入物与宿主骨达到更强的固定效果。植入骨盆骨十二周后,含涂层的植入物会获得更高的机械固定值。

植入12 周后的组织学评价



涂层植入物显示出比无涂层PEEK具有更高的骨整合度:骨与涂层直接接触,而无涂层PEEK的直接接触非常有限。



含钛涂层的PEEK医疗植入物示例



参考文献

1. T. Friesem, T. Brown, D. Zou, H. Ma, H. Yang, W. Wu: **“NuNec™: A PEEK-on-PEEK Cervical Arthroplasty System: In Clinical Perspective”**; Spinal Surgery News, Winter 2009.
2. S. Vedova, P. Robotti, A. Fabbri, D. Zeni, M. D'Amato, B. Monelli: **“Effects of Plasma Spray HA coating process onto mechanical properties of PEEK and Carbon Fiber Reinforced PEEK”**; Proceedings of the 8th World Biomaterials Congress; Amsterdam, May 28-June 1, 2008.
3. P. Robotti, S. Vedova, A. Fabbri, C. Migliaresi, V. Fontanari: **“Plasma Spray Deposition of Titanium and Hydroxyapatite on PEEK and Carbon Fiber-Reinforced PEEK”**; Proceedings of the Society for Biomaterials Annual Meeting, San Antonio, April 22-25, 2009.
4. P. Robotti, G. Zappini: **“Thermal Plasma Spray Deposition of Titanium and Hydroxyapatite on Polyaryletheretherketone Implants”**; Chapter 10, pages 147-177, PEEK Biomaterials Handbook by S. M. Kurtz, 2019. ISBN: 978-0-12-812524-3.
5. P. Robotti, G. Zappini: **“Metal and HA Coating Technologies for PEEK Implants”**; MD&M conference, Minneapolis, October 12-14, 2010.
6. P. Robotti, S. Stübinger et al.: **“Macroporous Titanium Coating on PEEK”**; IMPLANTS, Lyon, France, April 3-4, 2013.
7. G. Zappini, S. Stübinger et al.: **“Osteointegrative Coating Solutions for PEEL-based Implants”**; 1st International PEEK Meeting, Philadelphia, PA, USA, April 25-26, 2013.
8. S. Stübinger, E. Preve, A. Drechsler, G. Zappini, A. Bürki, B. von Rechenberg: **“Influence of Ti-coating on the osseointegrative properties of polyetheretherketone (PEEK) implants: Preliminary results of a pilot study in sheep”**, Proceedings of the 22nd Meeting of the European Association for Osseointegration; Dublin, October 17-19, 2013.
9. S. Stübinger, A. Drechsler, A. Bürki, K. Klein, P. Kronen, B. von Rechenberg: **“Titanium and hydroxyapatite coating of polyetheretherketone and carbon fiber-reinforced polyetheretherketone: a pilot study in sheep”**, J Biomed Mater Res Part B: Appl Biomater, 104B: 1182-1191, 2016).

Image of coated spinal cages on front cover courtesy of Invibio Ltd. Studies in quoted literature were performed using unfilled and reinforced PEEK-OPTIMA® biomaterials supplied by Invibio Ltd.

