

Author's Accepted Manuscript

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www.elsevier.com/locate/ceri

PII: S0272-8842(17)32089-8
DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.09.161>
Reference: CER116332

To appear in: *Ceramics International*

Received date: 1 August 2017
Revised date: 4 September 2017
Accepted date: 20 September 2017

Cite this article as: Chao Chen, Bo Feng, Shujuan Hu, Yue Zhang, Song Li, Longfei Gao, Xuemei Zhang and Kun Yu, Control of aluminum phosphate coating on mullite fibers by surface modification with polyethylenimine, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2017.09.161>

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Control of aluminum phosphate coating on mullite fibers by surface modification with polyethylenimine

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Abstract: Aluminum phosphate (AlPO_4) is a promising oxidation-resistant and weak interface for ceramic-matrix composites. In this research, AlPO_4 coating was deposited on mullite fibers by an improved liquid-phase method based on electrostatic attraction. A cationic polyelectrolyte, polyethylenimine (PEI), was used for surface modification of mullite fibers. The formation process, phase evolution and microstructure of the coating were studied. The zeta potential of AlPO_4 particles, PEI-adsorbed AlPO_4 particles, and PEI-adsorbed mullite particles was characterized to find the proper pH value for improving electrostatic attraction. The obtained AlPO_4 coating was porous and continuous, whose thickness could be controlled by multiple coating cycles. The

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