**272i Hydrophilic and Antimicrobial Zeolite Coatings**

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Condensing heat exchangers onboard manned spacecraft require hydrophilic fin surfaces to achieve effective gravity independent water separation. To prevent the proliferation of microbes, the fin surface must also be antimicrobial. For practical reasons, the hydrophilic and antimicrobial properties must be very durable under the expected working conditions. The currently used technology presents several limitations. The coating is applied by wash or dip coating method, which can be a problem in the case of small wavy fins because it can easily lead to clogged fins. The current coating also requires a high temperature curing process, which can be detrimental to the substrates mechanical properties. One of the most crucial limitations is that the antimicrobial agent functions by its natural dissolution in water, and when the antimicrobial agent is depleted, the coating has to be stripped and reapplied. This severely hinders the use-life of the coating and is unpractical for use on long voyages. Here, we show that silver exchanged zeolite A coating, deposited by an in-situ crystallization process, is a very promising replacement for the currently used technology. The in-situ crystallization process is a simple, low temperature, process and allows the zeolite to coat substrates with complex geometries and in small confined spaces. The zeolite coating is very hydrophilic, and it gains an incredibly effective antimicrobial function after a silver ion exchange. The use of silver as an antimicrobial agent is beneficial in that it is highly antimicrobial, and yet relatively non toxic to mammalian cells. The durability of the silver exchanged zeolite A coating was tested by leaching in water, and by repeated bacterial inoculations with E. Coli. We show that there is little or no loss of performance after 8 weeks of leeching, as well as after 6 iterations of bacterial attack. The hydrophilicity, high antimicrobial activity, ease of application, and high level of durability make the silver exchanged zeolite A coating a remarkable choice for use in condensing heat exchangers onboard manned spacecraft.