Abstract for an Invited Paper
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Material Science and Construction

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We will review the new materials and technologies that are being applied in the construction of high performance (green) buildings to improve energy efficiency, Indoor Air and Environmental Quality, water conservation and reclamation, and resource conservation. We present an introduction to state-of-the-art building concepts, including "Net-Zero" buildings, which generate as much energy as they use, reclaim water, and minimize waste; and "Waste as Resource," including waste to energy plants, biofuels, materials reclamation and recycling. The role of advanced materials and technologies, such as spectrally selective glazing, photocatalytic concrete, solar heating and cooling, and organic solar collectors will be discussed. We also give an overview of advanced analytic tools used in building design, including Computational Fluid Dynamics, energy, and lighting/daylighting computer-based simulation programs.