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Sustainable Materials for the Anthropocene MARTIN L. GREEN, National Institute for Standards and Technology (NIST) — Civilization on our planet took a sharp turn about 250 years ago, at the beginning of the industrial revolution. Arguably, its impact on humankind is equivalent to that of the invention of fire. The enormous consequences of industrial activity, positive and negative, could not have been anticipated, but we live with them today: per capita global consumption of energy is higher than ever, and demand for materials (relative to the year 1900) has increased by factors of 3 to 6000, depending on the element. Total population, as well as those segments of the population doing the consuming, is also increasing. Now we speak (informally, thus far) of the Anthropocene, the first geological epoch in which human activity is deemed to have had an effect on the Earth's ecosystem. For how much longer can economic growth and demand for goods be sustained? Can the human ingenuity that started the industrial revolution mitigate its effects? In this talk I will address the meaning and definition of sustainable development, and its intersection with materials science. Every human endeavor should be informed by sustainable development, because none of our material resources are in?nite and only a few sources of energy are sustainable. The immediate and direct connections between sustainable development and materials science include ef?cient use of materials, materials life cycle assessment, replacement materials, and energy-related materials. Sustainable development is an enormous field, and we are learning there is nothing we do as humans to ensure our survival (food, water, materials, shelter, economy, health) that lies outside of its boundaries.

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