



Materials for advanced ultra-super critical power plants

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Abstract

Higher process temperatures and pressures are mandatory to increase net efficiency and reduce CO₂ emissions. As consequence of these more severe operating conditions require better materials with higher demands for development, manufacturing and fabrication. This paper summarizes the current status of the art of the materials for ultra-supercritical coal fueled power plants and the trend for the development needed for the next generation called “advanced ultra-supercritical” targeting >50% efficiency, where nickel base superalloys will be necessary for the hottest part of the plant. This new generation of power plants will give an effort for the reduction of the CO₂ emission, because forecast confirm the coal will be the most relevant source for energy production at least for the next 30 years.

Biography

Augusto Di Gianfrancesco has been employed at the Centro Sviluppo Materiali (CSM) since February 1983 until December 2014, as a Senior Metallurgist and Project Leader for High Temperature Materials. He was responsible for R&D activities on steels and superalloys for high temperature applications in power generation plants. He was also a member of Management Committee of EU Program COST 522-536, Co-founder of the European Creep Collaborative Committee (ECCC) and Co-founder of the Italian Working Group on Creep Resistant Materials. He is an author and co-author of more than 300 technical reports and more than 100 papers presented at national and international conferences. Currently, he is Materials and Technologies Consultant and Chairman of the ECCC. He is the Editor of the “Materials for ultra-supercritical and advanced ultra-supercritical power plants”, published by Elsevier in 2016.

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