

Deposit formation in a full-scale pulverized wood-fired power plant with and without coal fly ash addition - DTU Orbit (09/11/2017)

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Ash transformation and deposition in a pulverized wood-fired power plant boiler of 800 MWth were studied with and without the addition of coal fly ash. The transient ash deposition behavior was investigated by using an advanced deposit probe system at two different boiler locations with flue gas temperatures of ~1300°C and ~800°C, respectively. It was found that during pulverized wood combustion, the deposit formation at the high-temperature location was characterized by a slow and continuous growth of deposits followed by the shedding of a large layer of deposits, while the deposit formation at the low-temperature location showed a slow initial build-up and a stable mass of deposits after approximately 1-5 h. The deposits collected during pulverized wood combustion contained a considerable amount of K₂SO₄, KCl, and KOH/K₂CO₃. With the addition of coal fly ash (~4 times of the mass flow of wood ash) to the boiler, these alkali species were effectively removed both in the fly ash and in the deposits, and a more frequent shedding of the deposits was observed. The results imply that coal fly ash can be an effective additive to reduce ash deposition and corrosion problems in a pulverized wood-fired boiler.

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Authors: Wu, H. (Intern), Shafique Bashir, M. (Intern), Jensen, P. A. (Intern), Sander, B. (Ekstern), Glarborg, P. (Intern)

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