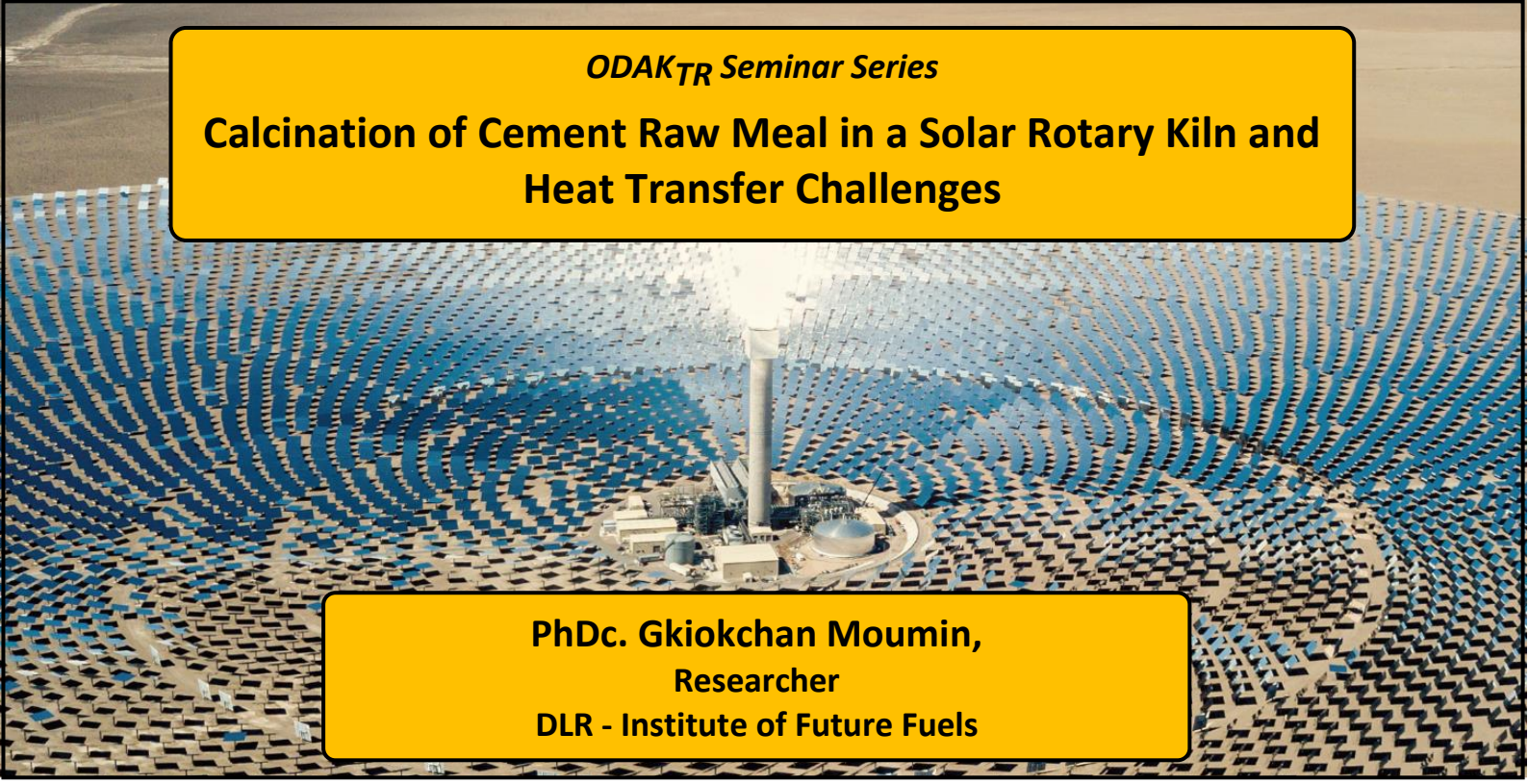

ODAK$_{TR}$ Seminar Series

Calcination of Cement Raw Meal in a Solar Rotary Kiln and Heat Transfer Challenges

PhDc. Gkiokchan Moumin,
Researcher
DLR - Institute of Future Fuels

Live Seminar Time and Date: 12:00-13:00 (Turkish time / GMT + 3)
Friday, Jan. 22, 2021

Recorded Seminar: Link

Registration for live seminar closes at 10:00, Thursday, 21 Jan. 2021: To receive the link to the live seminar you must register by 10:00, Thursday, 21 Jan. 2021.

Abstract: Concentrated solar energy can readily provide the temperatures needed for the calcination of cement raw meal, which requires about 900 °C. This step in the cement production alone is responsible for about 4 % of global CO_2 emissions. Previous solar thermal studies dealt with the reaction itself but did not utilize the particle size employed in the industrial cement production. The particle size is an important parameter though, which affects the particle motion, heat uptake and thus, the degree of calcination. Altogether, this affects the suitable reactors for such an application. The experimental calcination of industrial size cement raw meal in a solar heated rotary kiln was assessed in the EU-project SOLPART. Results will be shown from this work, together with the technical challenges, limiting factors and future potentials. The heat transfer into the cement raw meal is a key aspect which will be discussed based on experiments on the heat transfer analysis.

Short Bio: Gkiokchan Moumin is a researcher at the Institute of Future Fuels, formerly part of the Institute of Solar Research, which belongs to the German Aerospace Center (DLR). He studied chemical engineering at the Karlsruhe Institute of Technology (KIT) and is performing his PhD at the Institute of Solar Research in combination with the TU Dresden. The topic of his thesis was the solar calcination of cement raw meal in a rotary kiln and the heat transfer into cohesive particles, which was embedded in the EU-project SOLPART.

About DLR's Institute of Future Fuels: DLR's Institute of Future Fuels is recently founded from the Solar Process Engineering Department of the Institute of Solar Research, and develops concentrating solar systems for the generation of process heat and fuels. With the founding, the DLR is supplementing and strengthening its research into solar energy production, hydrogen storage and other resources for the production of renewable fuels. The institute is represented at the DLR sites in Cologne and Jülich. Jülich is home to the Institute's large-scale facility: Synlight, the world's largest facility for the production of artificial sunlight. In addition, the institute operates a solar furnace at its headquarters in Cologne and a small high-flux solar simulator.

About ODAK$_{TR}$: *ODAK$_{TR}$* is a national CST initiative led by METU-GÜNAM with objectives to

1. Support Turkey's energy transition through the development & commercialization of CST technologies;
2. Catalyze domestic CST economic activity by supporting growth in markets, industrial capacities, and industrial activities;
3. Strengthen Turkey's CST Research and Innovation (R&I) capacities, including by creating globally competitive CST research opportunities at Turkish universities.

One of *ODAK$_{TR}$*'s main strategies to achieve these objectives is through harmonization of national activities with EU CST initiatives by strengthening and exploiting synergies created by METU-GÜNAM's role as Turkey's National Node for the CST European Research Infrastructure Consortium (ERIC) EU-SOLARIS, and participation in 5 EU H2020 projects: 1. SolarTwins; 2. HORIZON-STE; 3. SFERA-III; 4. INSHIP; and 5. GeoSmart.

About the ODAK$_{TR}$ Seminar Series: Through the ODAK$_{TR}$ Seminar Series, leading CST experts from METU-GUNAM's strategic CST partners CIEMAT-PSA (Spain) and DLR (Germany) and other CST experts will give seminars targeting the Turkish CST community and tailored to support realization of ODAK$_{TR}$'s objectives. The ODAK$_{TR}$ Seminar Series is being executed within the framework of the H2020 Project SolarTwins and this specific seminar is co-sponsored by the H2020 Horizon-STE project. The current ODAK$_{TR}$ Seminar Series schedule is as follows, with all seminars from 12:00-13:00 Turkish time:

Date	Speaker, Institution	Seminar Title
18 Dec. 2020	Prof. Dr. Eduardo Zarza, CIEMAT-PSA, Spain	An Introduction to Concentrating Solar Thermal (CST) Technologies and Applications
08 Jan. 2021	Dr. Yelda Erden-Topal, UPM & CIEMAT, Spain, and METU TEKPOL, Turkey	CST in Turkey: Current State and National Strategies to Exploit Opportunities
15 Jan. 2021	Dr. Florian Wiesinger, DLR - Institute of Solar Research, Germany	Quality Assessment and Accelerated Aging Experiments of Optical Components for CSP Plants
22 Jan. 2021	PhDc. Gkiokchan Moumin, DLR - Institute of Future Fuels, Germany	Calcination of Cement Raw Meal in a Solar Rotary Kiln and Heat Transfer Challenges
5 Feb. 2021	Dr. Inmaculada Polo, CIEMAT-PSA, Spain	Antibiotic Resistant Bacteria: occurrence and removal from urban wastewater
12 Feb. 2021	Dr. Reiner Buck, DLR - Institute of Solar Research, Germany	Solar Particle Technology for Dispatchable Power and Heat Generation
19 Feb. 2021	Marcel Bial, ESTELA- The European Solar Thermal Electricity Association	First learnings from a multifold stakeholders position review regarding the deployment of CSP in Europe
26 Feb. 2021	Dr. Isabel Oller, CIEMAT-PSA, Spain	Water-Energy-Food nexus in industrial and urban wastewater recovery

About the H2020 SolarTwins Project: The aim of the SolarTwins project is to step-up the scientific excellence of the promising CST Research Division *ODAK* of METU-GÜNAM (Coordinator) in collaboration with the internationally leading CST institutions CIEMAT-PSA (Spain) and DLR (Germany). SolarTwins includes 4-weeks of CST summer schools at METU taught by leading experts from CIEMAT-PSA and DLR and METU graduate students co-advised by experts from CIEMAT-PSA and DLR. An expected impact is the establishment of competitively-funded METU-CIEMAT and METU-DLR Joint Research Lines.

About the SOLPART Project: The Horizon 2020 project SOLPART dealt in the years 2016-2020 with the development of a solar process, for a high temperature (800-1000 °C), 24 h/day particle treatment in energy intensive non-metallic minerals' industries. The consortium consisted of 11 partners from research and industry, among others CNRS, ABENGOA Research and Cemex. The DLR focused on one of the solar reactors as well as the handling and storage.

About METU-GÜNAM's CST Research Division *ODAK*: ODAK includes a diverse set of academics and post-doctoral researchers who are actively contributing to METU-GÜNAM's National and European CST activities:

Burcu AKATA KURÇ	MNT, METU	Feyza KAZANÇ	ME, METU
Derek BAKER	ME, METU	Zöhre KURT	EnvE, METU
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Yelda ERDEN TOPAL	TEKPOL, METU		

Contact: Derek BAKER
dbaker@metu.edu.tr
http://users.metu.edu.tr/dbaker/

Yelda ERDEN TOPAL
yeldae@metu.edu.tr

EU Projects and Activities Showcased by ODAK$_{TR}$

SolarTwins | HORIZON STE | EU SOLARIS | inship | SFERA-III | GEOSMART

ODAK$_{TR}$ Organizing Institutions

ODTÜ METU | GÜNAM Center for Solar Energy Research and Applications | CIEMAT PSA | DLR

Funding Agencies Supporting Projects Showcased by ODAK$_{TR}$

The European Union projects have received funding from the Horizon 2020 research and innovation program under grant agreements No 856619 (SolarTwins), 838514 (HORIZON-STE), 731287 (INSHIP), 823802 (SFERA-III), and 818576 (GeoSmart).

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