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Abstract

1. Objective/Scope:

Production sand is obtained from desander unit which separates sands from natural gas. Subsequently, this produced sand is sent onshore for disposal at cement plants, waste treatment facilities or landfill. At Zawtika asset, the quantity of production sand continues to rise which causes problems to the management. Hence, sand waste upgrading to high value-added products is one of the alternative solutions for the reduction of wastes to landfill and to support PTTEP's Sustainable Development targets.

2. Methods, Procedures, Process:

Naturally, sand is composed of silicon dioxide (SiO₂) as the main component. Therefore, sand can be used as a raw material for high value-added silica-based materials synthesis such as high purity silica and zeolite. Typically, zeolite is one of the most promising materials in various applications such as adsorption and catalysis. Moreover, pelletization process of zeolite is crucially required for the industrial application because of ease of handling and operation. Indeed, the adsorption application with pelletization can lead to internal use of PTTEP assets such as dehydration process to capture moisture contents in gas stream as an adsorbent.

3. Results, Observations, Conclusions:

According to high silica contents inside produced sand, the silica extraction method is applied to remove impurity and to achieve high purity silica, which is about 98 wt.%. Additionally, Zawtika sand is very fine particles with nanometer size, so the extracted silica becomes high purity "Nanosilica" with 21.07 ± 3.09 nm. This nanosilica is such a great raw material for further silica-based material synthesis such as zeolite, which is high value-added product for industrial application especially dehydration. As-synthesized zeolite from sand is successfully synthesized to be various types such as ZSM-5, Faujasite and Zeolite A, which is the most suitable for dehydration process. These synthesis results confirmed that the extracted silica has a good grade with high purity. Moreover, in this work, one important challenges for the success of this project is the pelletization of zeolite A powder which is basically the transformation of an impractical powder

form to a more practical pellet form commonly used in industrial applications such as dehydration. This pelletization process illustrates promising results including comparable water adsorption capacity (18.3 wt.% vs 19.4 wt.% of commercial zeolite) and low reduction of compressive strength after adsorption (less than 10%).

4. Novel/Additive Information:

This project is the first internal utilization of sand waste to be high value-added product such as zeolite with pelletization procedure for industrial dehydration application. This internal use of zeolite pellets as desiccant will promote PTTEP sustainable operation which will also help reduce the cost of commercial desiccants about 40% and overcome sand waste management for PTTEP assets. Furthermore, this advantage of cost reduction leads to explore opportunities for this desiccant outside PTTEP.