CONCLUSIONS

1. Conclusions

From the results of experiment, the conclusions are as follows:

1.1 The average particle size of CeO_2 obtained from mixing of two microemulsions (method 3) are smallest, the average particle size of CeO_2 obtained from combined methods of homogeneous precipitation and microemulsion (method 2) are smaller than that from microemulsion method (method 1) and the trend is the same with different cerium sources and surfactants.

1.2 The average particle size of CeO_2 particles obtained from $(NH_4)_2Ce(NO_3)_6$ as cerium source are smallest, the average particle size of CeO_2 obtained from $Ce(NO_3)_3{\cdot}6H_2O$ as cerium source are smaller than that from $CeCl_3{\cdot}7H_2O$ and the trend is the same with different methods and surfactants.

1.3 The average particle size of CeO_2 particles obtained from CTAB as surfactant are smallest, the average particle size of CeO_2 particles obtained from Brij96V as a surfactant are smaller than that from PE4LE and the trend is the same with different methods and cerium sources.

1.4 If the hydrophobic hydrocarbon (HC) chain length is longer and the hydrophilic polyoxyethylene (POE) chain length is shorter the solubility of the surfactant in water decreases and its solubility in n-hexane increases, the sizes of the water droplets in micelles are smaller resulting in smaller sizes of the particles.

1.5 The smallest CeO_2 particles are from preparing by mixing of two microemulsions method using $(NH_4)_2Ce(NO_3)_6$ as a cerium source and CTAB as a surfactant. The average particle size is about 4.1 nm.

1.6 The average sizes of prepared CeO_2 particles are in the range of 4-11 nm.

2. Suggestion for further study

Suggestions are shown below.

2.1 The sort of surfactant of anionic surfactant should be compared with cationic and nonionic surfactants.

2.2 More nonionic surfactants of different hydrocarbon chain lengths should be studied.

2.3 Effect of water to surfactant ratio on the particle size should be investigated. The particles should have narrow size distribution.

2.4 CeO_2 of different sizes should have been tested for their applications.