Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Liquid Crystalline Phase Transition of Colloidal Platelets with Identical Thickness[1] DAZHI SUN, ZHENGDONG CHENG, HUNG-JUE SUE, Texas A&M University, PROF. SUE'S TEAM, PROF. CHENG'S COLLABORATION — The disorder – order transition in discotic colloids has been an active research area since the observation of the nematic phase in clay suspensions by I. Langmuir in 1938. In the past decade, synthetic platelets have been used extensively to investigate the discotic liquid crystal phase transitions. Here, we report the phase behavior of a new model platelet system – alpha-zirconium phosphate (ZrP). After exfoliation, the monolayer ZrP platelets possess uniform thickness, but have a high polydispersity in diameter. We observed an isotropic – nematic transition in our system upon increasing the platelet volume fraction, followed by the formation of the discotic smectic phase, an elusive phase that has been rarely seen in discotic liquid crystals. The discotic smectic phase (domain) is characterized by X-ray diffraction, high-resolution transmission electron microscopy, and optical microscopy. The equation of state (EOS) of our system is also discussed.

[1]Special thanks are given to The Dow Chemical Company for their partial financial support. Acknowledgment is also made to the donors of the American Chemical Society ACS Petroleum Research Fund (RPF#43053-G7).

Dazhi Sun
Texas A&M University

Date submitted: 25 Nov 2008 Electronic form version 1.4