Supplementary Materials

Influence of MoS_2 nanosheet size on performance of drilling mud

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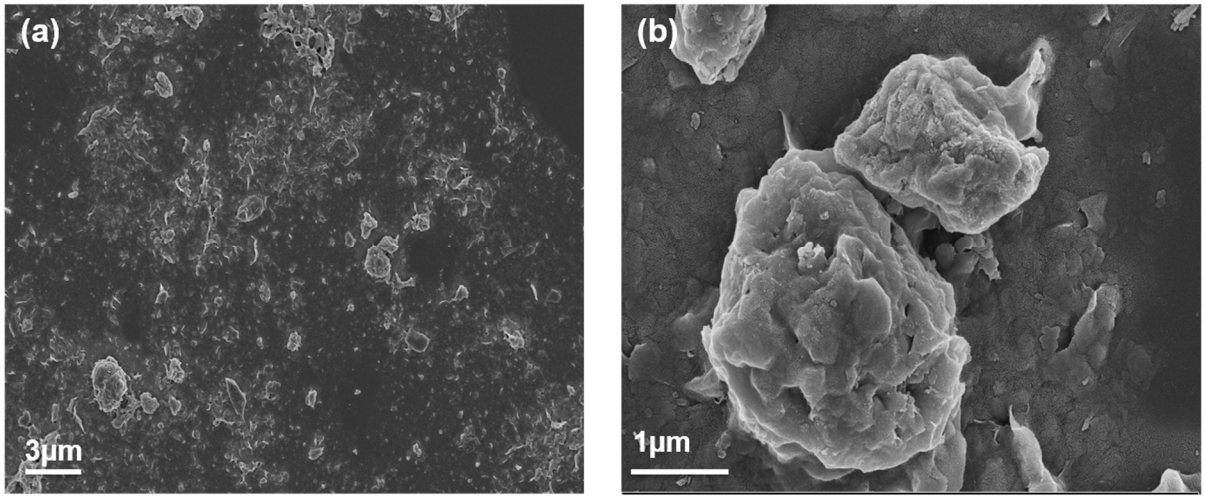

Figure S1. FE-SEM image of bentonite. (a) The particle size of bentonite is about 1 to 3 μm. (b) The particle shape appears to have a rough spherical surface.

Table S1. Table of WBM compositions. MoS_2 was divided into 4 kinds of N-S, N-B, M-S and M-B and concentrations of 1, 3 and 5wt% were added to the base fluid.

WBM	Bentonite	MoS_2 Thickness	MoS_2 Diameter	MoS_2 Concentration
Base fluid	5wt%	-	-	-
+1wt% N-S	5wt%	1-2 nm	100-400 nm	1wt%
+3wt% N-S	5wt%	1-2 nm	100-400 nm	3wt%
+5wt% N-S	5wt%	1-2 nm	100-400 nm	5wt%
+1wt% N-B	5wt%	1-2 nm	300-600 nm	1wt%
+3wt% N-B	5wt%	1-2 nm	300-600 nm	3wt%
+5wt% N-B	5wt%	1-2 nm	300-600 nm	5wt%
+1wt% M-S	5wt%	5-10 nm	100-400 nm	1wt%
+3wt% M-S	5wt%	5-10 nm	100-400 nm	3wt%
+5wt% M-S	5wt%	5-10 nm	100-400 nm	5wt%
+1wt% M-B	5wt%	5-10 nm	400-650 nm	1wt%
+3wt% M-B	5wt%	5-10 nm	400-650 nm	3wt%
+5wt% M-B	5wt%	5-10 nm	400-650 nm	5wt%

Table S2. The table of WBM's thermal conductivity. WBM with 5wt% nanosheets and big diameter MoS2 showed the highest thermal conductivity.

WBM	Thermal conductivity (W/m·K)	Rate of increase (%)
Base fluid	0.577	-
+1wt% N-S	0.591	2.4
+3wt% N-S	0.597	3.5
+5wt% N-S	0.609	5.5
+1wt% N-B	0.596	3.3
+3wt% N-B	0.611	5.9
+5wt% N-B	0.648	12.3
+1wt% M-S	0.597	3.5
+3wt% M-S	0.609	5.5
+5wt% M-S	0.639	10.7
+1wt% M-B	0.595	3.1
+3wt% M-B	0.609	5.5
+5wt% M-B	0.620	7.5