Supporting Information

GEOLOGICAL SETTINGS

The potential CO\textsubscript{2} storage site is located on the Yunghoshan structure, which is in the foothills of northwestern Taiwan. On the surface, the foothill belt is characterized by several anticlines that are separated by thrust faults (see Supporting Information Fig. S1(a)). In the eastern part of the belt, the trend of the anticlines with associated thrust faults, including the Paoshan (Hsincheng thrust, HCNF) and the Yunghoshan-Chinshui (Luchukeng thrust, LCKF) anticlinal structures, are mostly NNE-SSW, parallel to the general trend of the mountain range to the east (see Supporting Information Fig. S1(a)). In the western part, where it is adjacent to the coastal line, the trends of the anticlines, including the Chingtsaohu, Chiting, Chunan, Paishatun, and Sanhu anticlines, are NEE-SWW, parallel to the faults trending at a high angle toward the mountain belt.

The Yunghoshan structure is cut off by NEE-SWW trending high angle faults to its north and south and by the low angle Luchukeng thrust to its west (see Supporting Information Fig. S1(a)). In the subsurface, the structure is truncated by the Luchukeng thrust and forms two anticlines in the hanging wall and footwall of the thrust (see Supporting Information Fig. S1(b)). Both anticlines are asymmetric, with western limbs that are steeper than the eastern ones.

The target reservoirs considered for possible future CO\textsubscript{2} storage are the sandstone layers (the Talu Sandstone (Mtlss) reservoirs) in the lower part of the Talu Formation (Mtl) (see Supporting Information Fig. S1(a)(b)), which are part of the footwall of the thrust and were deposited during the Early-Middle Miocene (~14 m.y. bp). The Talu Sandstone reservoir is about 50 meters thick at a depth of 3250 m. It contains one thin layer of shale dividing the sandstone into two separate layers and is composed of mid-to-coarse grained well-compacted sandstones.
The Talu Sandstone reservoir is capped by the 200-meter thick Talu Shale (see Supporting Information Fig. S1(b)(c)), which is mainly composed of dark-grey to black-grey shales and sandy shales, with thin interlayers of muddy sandstones.

Fig. S1. Regional geological map of northwestern Taiwan (from the Chinese Petroleum Corporation, 1994). The highlighted rectangle is located on the southwestern part of the Yunghoshan structure. The black dot in (a) shows the location of well Y-6, from which the rock samples were collected. (b) Subsurface geological profile of the Yunghoshan structure. (c) Lithofacies of the Talu Formation shown by spontaneous potential and
resistivity electric logs of well Y-6. The 50-meter thick Talu Sandstone reservoir, the potential reservoir for CO$_2$ storage, is capped by the 200-meter thick Talu Shale.