This work investigates long-term photoelectrochemical hydrogen evolution (82 days) in 1 M HClO₄ using a TiO₂:H protected crystalline Si-based photocathode with metal-oxide-semiconductor (MOS) junctions. It is shown that day/night cycling leads to relatively rapid performance degradation while photocurrent under the continuous light condition is relatively stable. We observed that the performance loss is mainly due to contamination of catalytic surface with carbonaceous material. By ultraviolet (UV) light exposure, we also observed that the activity can be restored likely owing to the photocatalytic degradation of organics on the TiO₂ protection layer.