## Supporting Information

# Kinetic models assessment for swelling of coal induced by methane and carbon dioxide sorption

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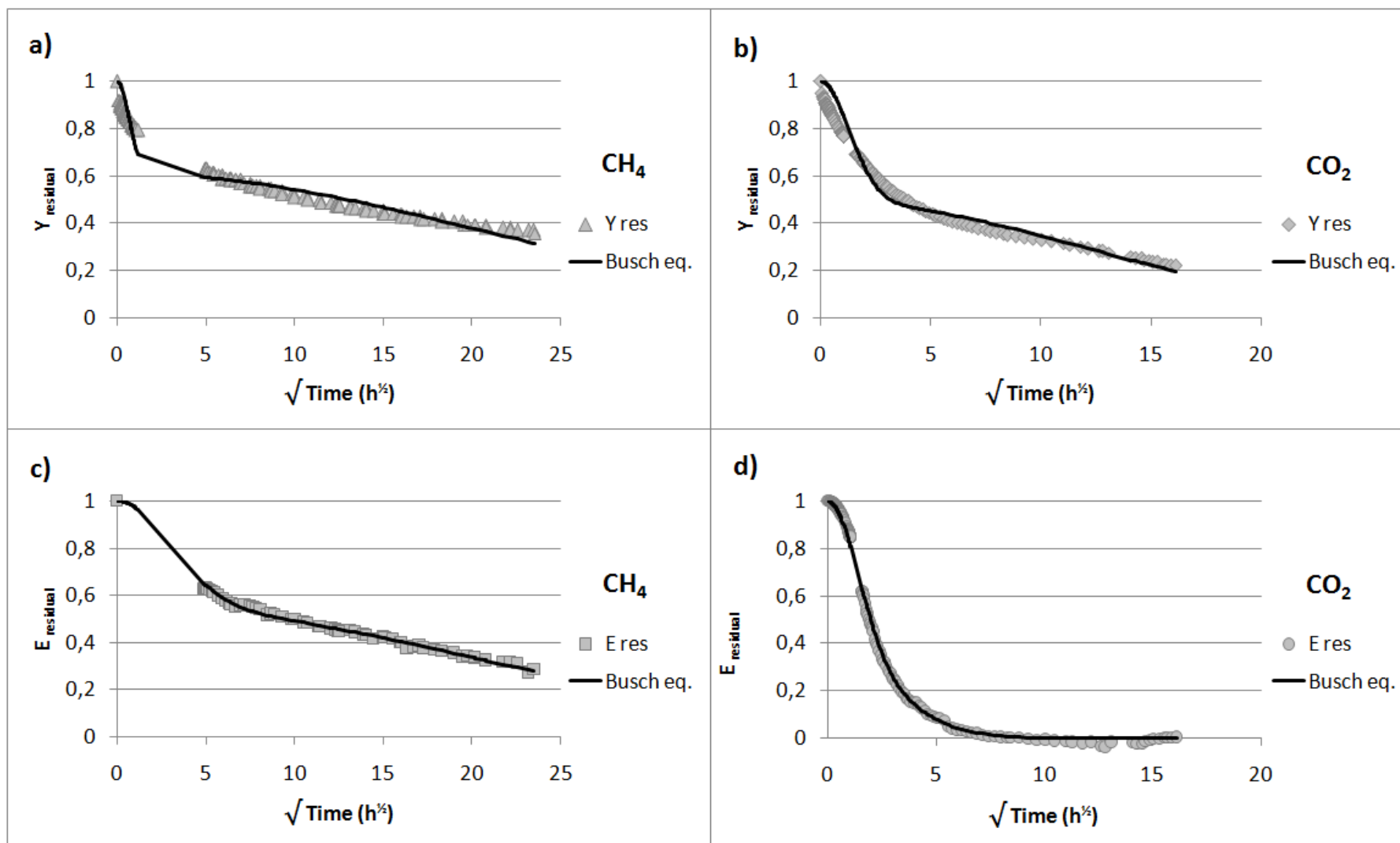Aleja Mickiewicza 30, 30-059 Cracow, Poland*

**Fig. S1** Application of the Busch equations to the kinetics for (a) $CH_4$ and (b) $CO_2$ sorption (Eq. (1)), and the sorption-induced coal swelling kinetics for (c) $CH_4$ and (d) $CO_2$ (Eq. (2))
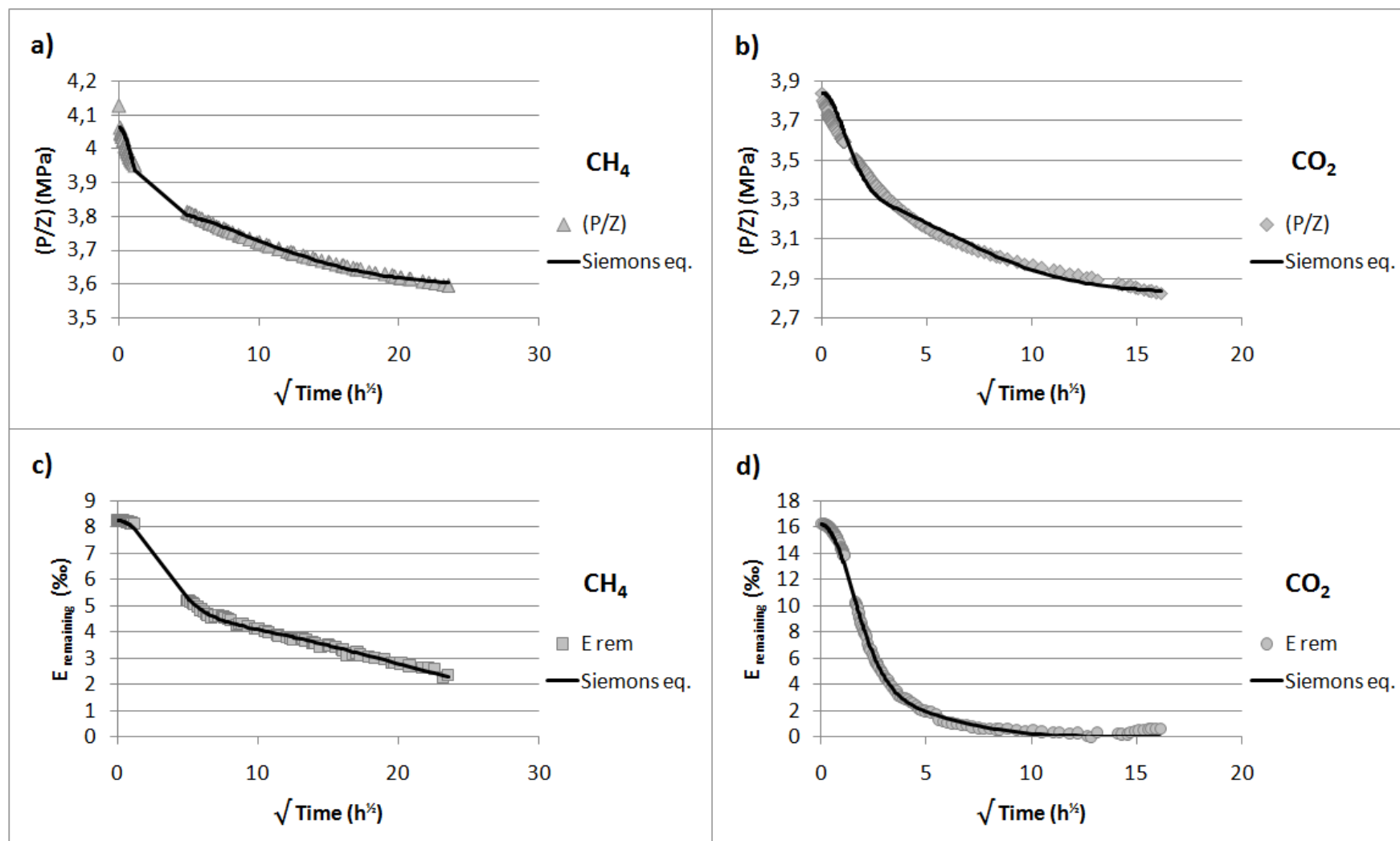
**Fig. S2** Application of the Siemons equations to the kinetics for (a) $CH_4$ and (b) $CO_2$ sorption (Eq. (3)), and the sorption-induced coal swelling kinetics for (c) $CH_4$ and (d) $CO_2$ (Eq. (4))
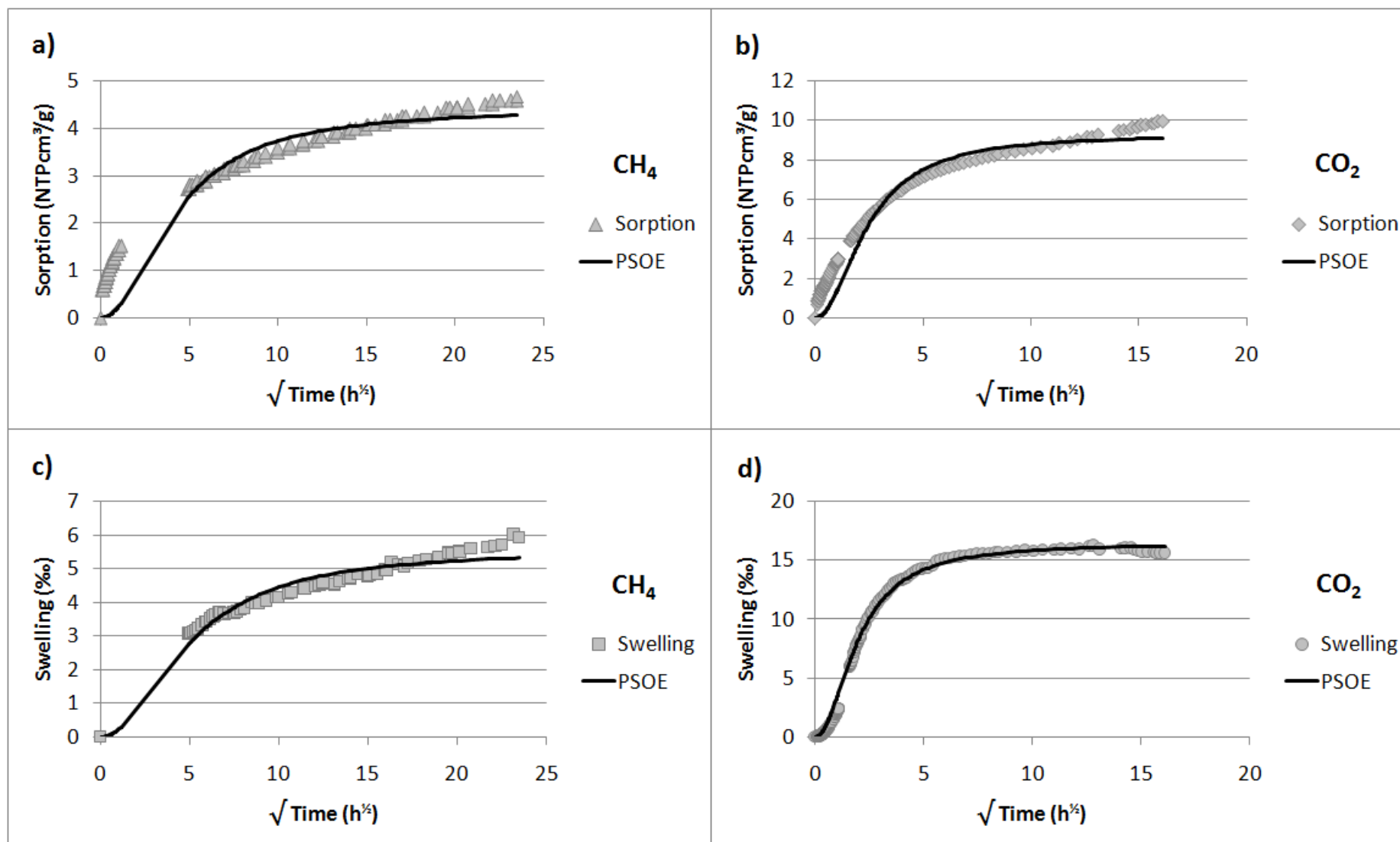
**Fig. S3** Application of the PSOEs to the kinetics for (a) $CH_4$ and (b) $CO_2$ sorption (Eq. (7)), and the sorption-induced coal swelling kinetics for (c) $CH_4$ and (d) $CO_2$ (Eq. (8))
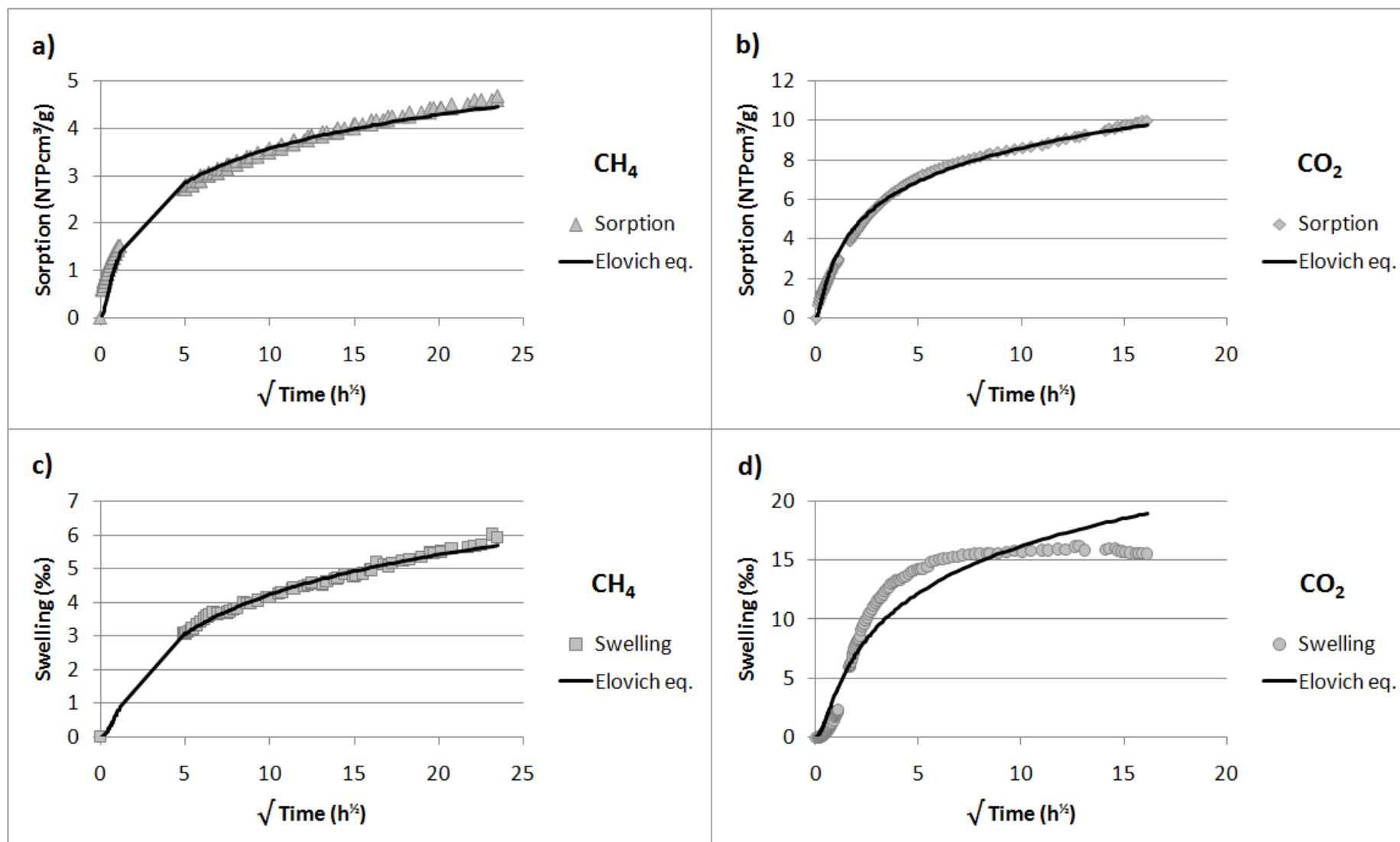
**Fig. S4** Application of the Elovitch equations to the kinetics for (a) $CH_4$ and (b) $CO_2$ sorption (Eq. (9)), and the sorption-induced coal swelling kinetics for (c) $CH_4$ and (d) $CO_2$ (Eq. (10))
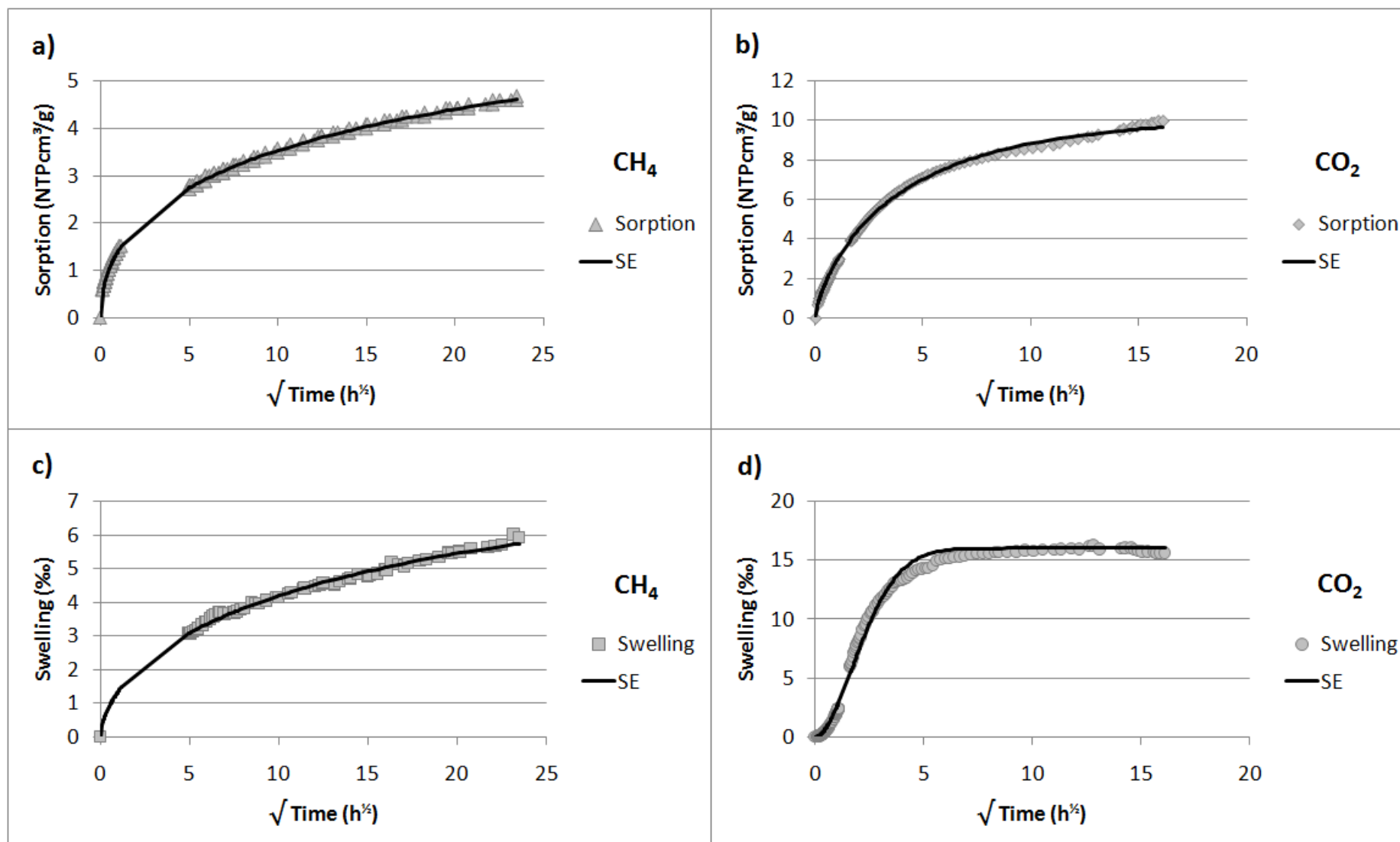
**Fig. S5** Application of the SE equations to the kinetics for (a) $CH_4$ and (b) $CO_2$ sorption (Eq. (11)), and the sorption-induced coal swelling kinetics for (c) $CH_4$ and (d) $CO_2$ (Eq. (12))