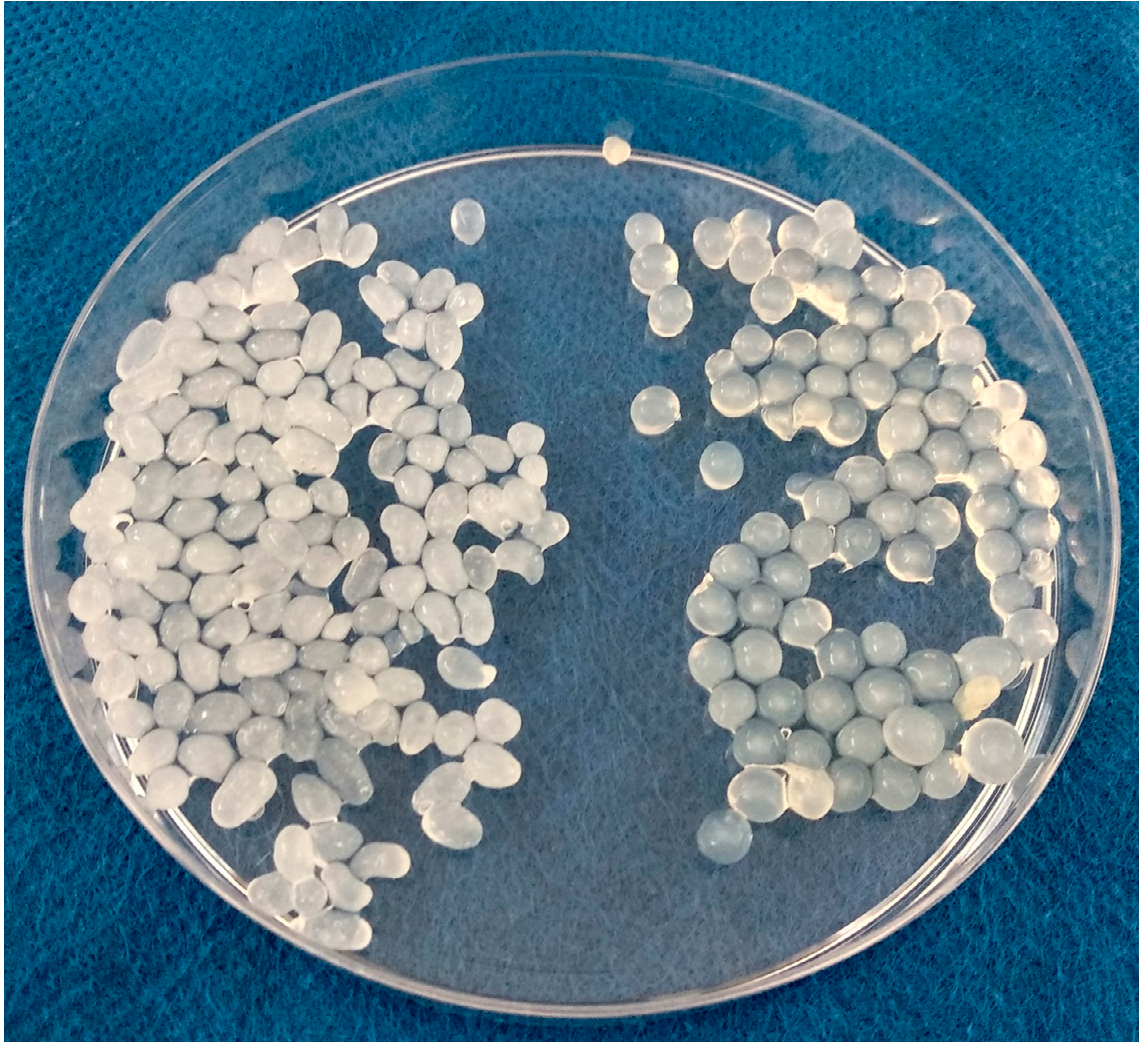




*Figure S1. Calcium alginate beads, either pure (CaAlg, right) or containing Ca-Al LDH (CaAlg/HC, left).*

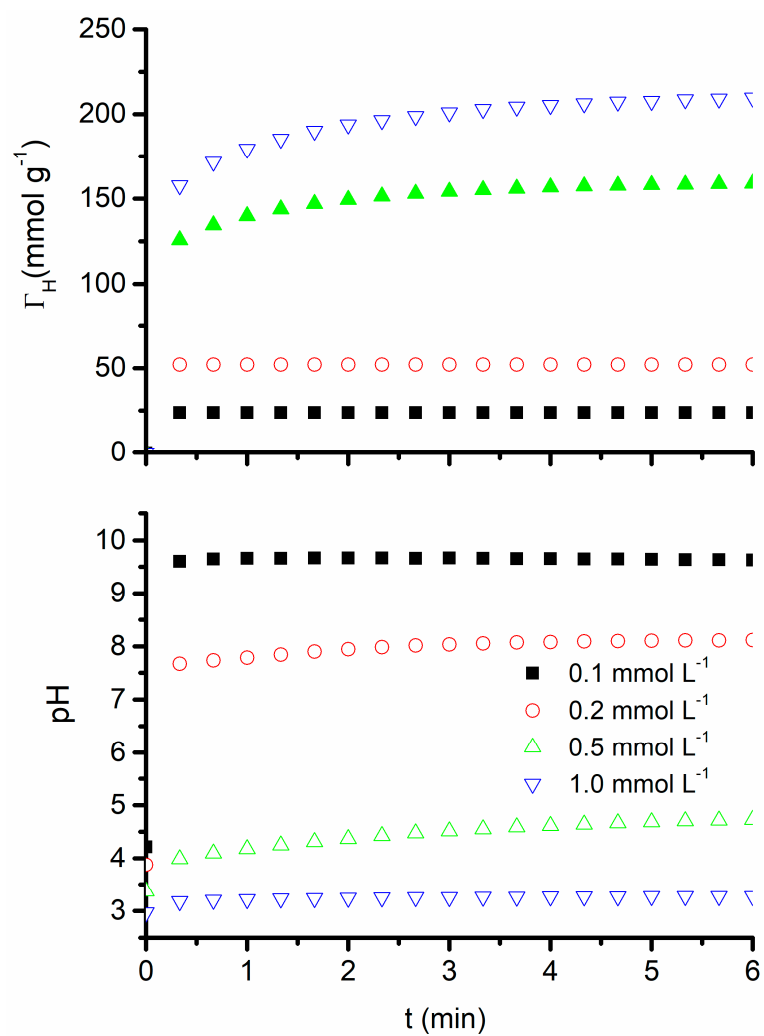


Figure S2. pH vs.  $t$  curves (below) and proton uptake ( $\Gamma_H$ ) kinetics (above) for HC placed in 100 mL solutions of increasing [HCl]. One out of 20 points are represented in the curves.

Table S1. Fitting constants of proton uptake kinetics according to the zero order model.

| Beads              | AlgCa              |                  |         |       | AlgCa/HC           |                  |         |       |
|--------------------|--------------------|------------------|---------|-------|--------------------|------------------|---------|-------|
| [HCl] <sup>a</sup> | $\Gamma_{H,150}^b$ | $\Gamma_{H,0}^b$ | $k_z^d$ | $R^2$ | $\Gamma_{H,150}^b$ | $\Gamma_{H,0}^b$ | $k_z^d$ | $R^2$ |
| 0.1                | 0.5                | 0.055            | 0.020   | 0.972 | 0.5                | 0.038            | 0.092   | 0.985 |
| 0.2                | 1.6                | 0.204            | 0.041   | 0.968 | 1.6                | 0.193            | 0.034   | 0.975 |
| 0.5                | 3.2                | 0.463            | 0.068   | 0.955 | 3.9                | 0.606            | 0.046   | 0.955 |
| 1.0                | 4.8                | 0.685            | 0.100   | 0.970 | 5.6                | 0.859            | 0.080   | 0.960 |

<sup>a</sup> mmol L<sup>-1</sup>; <sup>b</sup>  $\mu\text{mol bead}^{-1}$ ; <sup>c</sup> min; <sup>d</sup>  $\mu\text{mol min}^{-1} \text{bead}^{-1}$