Metal-organic frameworks (MOF) have emerged as reticular materials with potential applications in gas storage and drug delivery as well as scaffolds for nanoscale devices. Sequestration of carbon dioxide from gaseous waste streams in the purification of petroleum-based compounds has become an especially pressing issue for the scientific and global community in light of the predicted detrimental effects of anthropogenic CO₂ production. We have discovered a series of MOFs that can be formed under mild conditions using alkali metal cations and carbohydrate-based struts from renewable sources. We have shown that these materials have a high preference for carbon dioxide over other waste gases such as methane and that, by pre-incorporation of a pH-indicator, the content of carbon dioxide can be colorimetrically monitored. This new MOF is permanently porous (1000–1200 m²/g surface area), capable of storing small organic molecules, and because it can be synthesized from food-grade starting materials, a promising vector for drug delivery.