Claims

1. A transistor for detecting gases in the ambient air comprising a plurality of electrodes with at least one electrode being a gate electrode, further at least one electrode being individually coated by a porous ceramic, wherein an ionogel is connecting all electrodes with each other, the ionogel being an ionic liquid immobilized by a matrix, wherein the ionic liquid infiltrates the pores of the porous ceramic.
2. The transistor of claim 1, wherein the porous ceramic is a metal oxide.
3. The transistor of claim 2, wherein the metal of the metal oxide is a post-transition metal.
4. The transistor of any one of claims 1 to 3, wherein at least one electrode of the plurality of electrodes comprises a material selected from platinum, gold, silver, carbon, conducting polymers, a combination thereof.
5. The transistor of any one of claims 1 to 4, wherein the matrix comprises a polymer selected from the group consisting of poly(vinylidene fluoride-co-hexafluoropropylene (PVDF-HFP), polyaniline (PANI), poly(ethylene oxide)/polyacrylonitrile/poly(methyl methacrylate)/poly(vinylidene fluoride), and a sulfonated tetrafluoroethylene based fluoropolymer-copolymer (Nafion).
6. The transistor of any one of claims 1 to 5, wherein the porous ceramic comprises a dopant.
7. The transistor of any one of claims 1 to 6, wherein the porous ceramic is coated with a noble metal.
8. The transistor of any one of claims 1 to 7, wherein the ionic liquid is 1-ethyl-3-methylimidazolium tetrafluoroborate ([EMIM][BF4]).
9. Use of a transistor of any one of claims 1 to 8 as an air-quality sensor.
10. A process (100) for making a transistor, the process comprising:
    - providing a plurality of electrodes, wherein one of the electrodes is a gate electrode (110);
    - individually depositing a ceramic precursor on at least one of the plurality of electrodes (130) by using a templated sol-gel process (200) to form a porous ceramic; and

- connecting the plurality of electrodes with an ionogel, the ionogel being an ionic liquid immobilized by a matrix (140), whereby the ionic liquid infiltrates the pores of the porous ceramic.