

Subsurface wireless chemical sensing strategy compatible with Ground Penetrating RADAR

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Ground Penetrating RADAR (GPR) is a suitable measurement candidate for the development of interrogative systems of passive buried transducers acting as cooperative targets in the field of sub-surface sensing. We address the compatibility of GPR for monitoring chemical compounds in soil or in the water table. This has been achieved by using a chemical sensor based on surface acoustic wave reflective delay lines interrogated by a GPR. As model target, we focus on hydrogen sulfide, which is a gas soluble in water causing health hazard and water pollution. After demonstrating the chemical functionalization of acoustic delay lines with a polymer designed for hydrogen sulfide detection through the specific reaction of sulfur with lead, we have successfully achieved the detection of hydrogen sulfide in air by GPR. We then consider extending this strategy towards sensors operating in liquid phase.