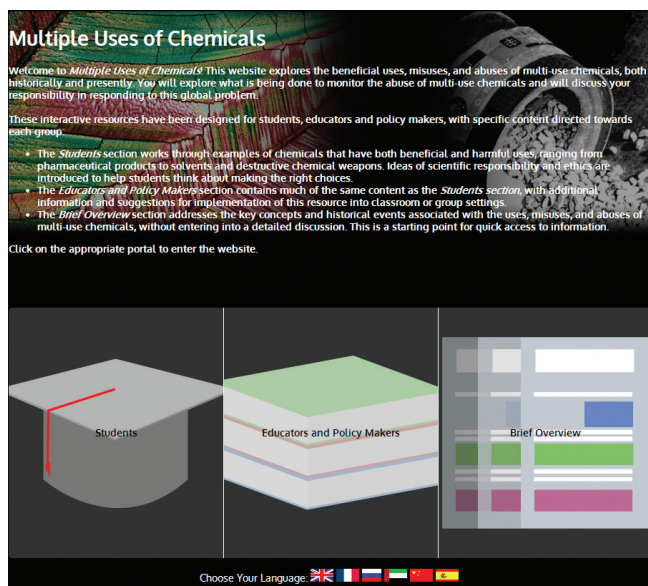


Multiple Uses of Chemicals



Homepage of www.iupac.org/multiple-uses-of-chemicals —the website designed to present educational material regarding the uses and misuses of multi-use chemicals, and to teach chemists and teachers about the importance of regulatory agencies such as the Chemical Weapons Convention and the creation of codes of conduct.

think “about how [they] can employ new communication tools to raise awareness of the need to practice responsible science, to instill the highest ethical standards in our future scientists and researchers.”

Chemical Weapons: The Human Toll

A stark reminder of the importance of communicating responsibility with respect to multi-use chemicals comes from grasping the short- and long-term human toll of the use of chemical weapons in Syria in 2013 and Iran in the late 1980s. 1000 people (mainly civilians) were killed in the August 2013 sarin attack near Damascus. Still unknown are the number injured in this attack and the extent of continuing health problems. So far no investigations have addressed this issue. During the Iraq/Iran war chemical weapons were used extensively by Iraq against Iranian soldiers and civilians, and in 1988 by Iraq against its own Kurdish community. At least 7000 Kurds died from chemical weapons in these attacks. Most were civilians, including many women and children. Well over 7000 were injured and millions of Kurds fled across borders into neighbouring Iraq, Turkey and Syria out of fear of the effects of these agents. The number of people who still bear the scars of these attacks in Kurdish areas is also unknown. At least two chemical weapons,

The OPCW strives to achieve its goal “to consign chemical weapons to history, forever,” through scientific work related to verification, international cooperation, and most recently, through education and outreach. Education is increasingly recognized as one of the first lines of defense to prevent the abuse of chemical substances, by equipping the public to respond to these issues. IUPAC is also concerned with ensuring that chemistry is practiced in a safe and beneficial way. IUPAC’s vision is “to advance the worldwide aspects of the chemical sciences and to contribute to the application of chemistry in the service of humankind.” To help ensure that chemistry acts “in the service of humankind,” IUPAC works through its Committee on Chemistry Education to provide free educational resources to raise awareness about the responsible use of chemistry in modern society.

One concrete step toward raising awareness of the need to practice responsible science has been taken through a joint IUPAC-OPCW project (project 2005-029-1-050 and 2013-020-1-050) to create a set of interactive electronic materials, *Multiple Uses of Chemicals*. This website (www.iupac.org/multiple-uses-of-chemicals) introduces students, educators, and policymakers to the topic of multi-use chemicals, and discusses how they can be used for beneficial purposes and misused to create illegal drugs or even chemical weapons. The website also includes

mustard gas and a nerve agent, possibly sarin, were used in the attacks. A nerve agent caused most of the fatalities. Iran still treats 30000 people, mainly former soldiers, for mustard gas related injuries. However, those being treated are the ones who were able to prove injury from mustard gas because of their army affiliations. Many others were not able to establish a causal link between mustard gas and their injuries, and have had to manage as best they can.

One of the major complications in making chemical weapons is the safety of the workforce involved in their manufacture, because of the potency of these substances. Creating these chemical weapons is within the reach of most competent chemists and the precursors are well known. It is, of course, illegal to do this and most countries have severe penalties for those who may be tempted. *Multiple Uses of Chemicals* was created, in part, to open the eyes of those who could be tempted, and to show them the destructive results that could result from their choices and actions.